CALIBRATION AND SERVICING HANDBOOK

1061

datron

digital voltmeter

CALIBRATION AND SERVICING HANDBOOK

for

THE DATRON AUTOCAL 1061 DIGITAL VOLTMETER

(for operating procedures refer to the User's Handbook)

850045 **Issue 6 (SEPT. 81)**

For any assistance contact your nearest Datron Sales and Service office.
Addresses can be found at the back of this handbook.

Due to our policy of continuously updating our products, this handbook may contain minor differences in specification, components and circuit design to the instrument actually supplied. Amendment sheets precisely matched to your instrument serial number are available on request.

© **1980 Datron Electronics**

Zero Gain I_b Ac Hf Lin
CALIBRATE

CONTENTS

GENERAL DESCRIPTION
INSTALLATION
MEASUREMENT PROCEDURES
SPECIFICATION AND SPECIFICATION VERIFICATION
SYSTEMS APPLICATIONS

Refer to User's Handbook

Section	Title	Page
1	CALIBRATION	1
1.1	INTRODUCTION	1
1.1.1	General	1
1.1.2	Essentials for Good Calibration	1
1.1.3	The 'AUTOCAL' Process	1
1.2	DC VOLTAGE CALIBRATION	2
1.3	OHMS CALIBRATION	4
1.4	AC VOLTAGE CALIBRATION	6
1.5	DC CURRENT CALIBRATION	8
1.6	AC CURRENT CALIBRATION	9
1.7	'AUTOCAL' USING 'KEYBOARD'	10
1.8	'AUTOCAL' OVER THE BUS	11
2	MECHANICAL DESCRIPTION	13
2.1	GENERAL	13
2.2	FRONT PANEL	13
2.3	REAR PANEL	13
2.4	EXTERNAL CONSTRUCTION	13
2.5	INTERNAL CONSTRUCTION	13
3	TECHNICAL DESCRIPTION	15
3.1	INTRODUCTION	15
3.2	ANALOG ASSEMBLY	15
3.2.1	Analog Interface	15
3.2.1.1	Introduction	15
3.2.1.2	Power-On	15
3.2.1.3	General Interface Update Sequence	17
3.2.1.4	Test	17
3.2.2	DC Isolator Section	17
3.2.2.1	Preamplifier Scaling	17
3.2.2.2	Preamplifier	20
3.2.2.3	DC Bootstrap	20
3.2.2.4	Filtering	20
3.2.2.5	Input Current Compensation	21
3.2.2.6	Test	21
3.2.3	Analog to Digital Conversion (Analog Section)	21
3.2.3.1	General Principles	21
3.2.3.2	A-D Input Control	23
3.2.3.3	Reference Voltages and Control Logic Power Supply	23
3.2.3.4	High Speed Buffer	24
3.2.3.5	Integrator	24

Section	Title	Page
	3.2.3.6 1st Null Detector	25
	3.2.3.7 2nd Null Detector	25
	3.2.3.8 Reset Period	25
3.3	AC ASSEMBLY	27
	3.3.1 General Principles	27
	3.3.2 Preamplifier and Scaling	27
	3.3.3 RMS Converter	28
	3.3.4 High Frequency Compensation	29
	3.3.5 Frequency Detection	29
	3.3.6 Test	29
3.4	OHMS ASSEMBLY	29
	3.4.1 Low Drift Voltage Follower	30
	3.4.2 Constant Current Source	30
	3.4.3 Test	31
3.5	CURRENT ASSEMBLY	31
	3.5.1 Current Measurements	32
	3.5.2 Test	32
3.6	REAR INPUT/RATIO INPUT	32
	3.6.1 General	32
	3.6.2 Front Panel/Rear Panel Input	32
	3.6.3 Ratio	32
	3.6.4 Test	33
3.7	ANALOG OUTPUT	33
	3.7.1 General	33
	3.7.2 Description	33
3.8	DIGITAL ASSEMBLY	33
	3.8.1 Processor and Memory	33
	3.8.1.1 Software Overview	34
	3.8.1.2 The Two-Phase Clock	36
	3.8.1.3 RAM/ROM Circuit	36
	3.8.2 CMOS Address Decode and Input/Output Circuits	36
	3.8.3 Analog to Digital Conversion (Digital Section)	39
	3.8.3.1 General Principle	39
	3.8.3.2 Preset Procedure	39
	3.8.3.3 A-D Measurement Sequence	41
	3.8.3.4 Master Clock and Line Locking	41
3.9	FRONT PCB ASSEMBLY	42
	3.9.1 Analog Input Signals	42
	3.9.2 Display Signals	42
	3.9.3 Keyboard Data Encode	42
	3.9.4 Keyboard LED Data Decode	43
3.10	DISPLAY DRIVER ASSEMBLY	45
	3.10.1 Write Mode	45
	3.10.2 Read Mode	45
3.11	IEEE DIGITAL INTERFACE	46
	3.11.1 RAM/ROM Circuit	46
	3.11.2 Interface Circuit	46

Section		Title	Page
	3.12	BCD DIGITAL INTERFACE	47
	3.12.1	RAM/ROM Circuit	47
	3.12.2	Interface Circuit	47
	3.13	REAR (POWER SUPPLY) PCB ASSEMBLY	48
	3.13.1	General	48
	3.13.2	180V Supply	48
	3.13.3	5V Supply	48
	3.13.4	±15V Supply	48
	3.14	SELF TEST SEQUENCE	48
4		INTERNAL ADJUSTMENT PROCEDURES	51
	4.1	ALTERATION OF LINE VOLTAGE AND FREQUENCY	51
	4.1.1	Changing Line Voltage	51
	4.1.2	Changing Line Frequency	51
	4.2	BATTERY REPLACEMENT	51
	4.3	POST-REPAIR PROCEDURES	51
	4.3.1	Basic DC Instrument	52
	4.3.2	Ohms Assembly	53
	4.3.3	AC Assembly	53
	APPENDIX 1	ANALOG DATA LINE 'F.E.T.' PATTERNS	55
5		COMPONENT LISTS, BOARD LAYOUTS AND CIRCUIT DIAGRAMS	
		Interconnection Diagram	430291
		Front PCB Assembly	400294/430294
		Rear PCB Assembly	400295/430295
		Centre PCB Assembly	400296/430296
		Left Hand PCB Assembly	400297/430297
		Right Hand PCB Assembly	400298/430298
		Current Assembly	400304/430304
		IEEE Interface Assembly	400306/430306
		Ratio/Rear Input	400307/430307
		Analog Output	400308/430308
		Analog Assembly	400328/430328
		Digital Assembly	400329/430329
		Display Driver Assembly	400330/430330
		Ohms Assembly	400331/430331
		BCD Interface Assembly	400332/430332
		Rear Input	400386/430386
		AC Assembly	400402/430402

ILLUSTRATIONS AND TABLES

Figure	Title	Page
1.1	Zero Resistance Source Connections	4
2.1	Exploded View of Instrument	14
3.1	Printed Circuit Boards Block Diagram	15
3.2	Power-On Options Fitted Test	16
3.3	Analog Interface Sequence: Power-Up	16
3.4	Analog Interface Data Line Timing Diagram (Power-Up)	16
3.5	Analog Interface Sequence: Ohms Select	17
3.6	General Form of Analog Interface Update Timing Diagram	18
3.7	Simplified Diagram of DC Isolator	18
3.8	Simplified Diagram of Isolator Switching	19
3.9	Preamplifier Gain Circuits	20
3.10	Simplified DC Isolator Filtering Circuit	21
3.11	Simplified Diagram of Bias Current Compensation	21
3.12	Simplified Diagram of Analog Section of A-D Converter	22
3.13	Timing Diagram For Analog Section of A-D Converter	22
3.14	Multiplexer Control Line Signals	23
3.15	Positive Reference Circuitry	23
3.16	High Speed Buffer Circuitry	24
3.17	Integrator Circuit	24
3.18	1st Null Detector Circuitry	25
3.19	2nd Null Detector Circuitry	25
3.20	Diagram of Averaging Process	26
3.21	Simplified Diagram of A-D During Reset Period	26
3.22	Simplified Diagram of AC Assembly	27
3.23	Simplified Diagram of the AC Preamplifier Scaling	28
3.25	Block Diagram of RMS Conversion Technique	28
3.26	Simplified Diagram of AC High Frequency Compensation	29
3.27	Simplified Resistance Assembly	29
3.28	Simplified Diagram of Voltage Follower Circuit	30
3.29	Ohms Current Range Switching	30
3.30	Simplified Ω Current Switching	31
3.31	Use of Ohms Guard	31
3.32	Simplified Diagram of Current Assembly	32
3.33	Simplified Block Diagram of Digital Assembly	33
3.34	Job Scheduler	34
3.35	Two-Phase Clock Generation	35
3.36	Timing Diagram of Stretched Two-Phase Clock	36
3.37	Simplified Diagram of Memory Circuits	37
3.38	Start Up and Non-Volatile RAM Protection	38
3.39	CMOS Address Decoding	38
3.40	Simplified Diagram of Digital Section of A-D Converter	39
3.41	Flowchart of A-D Digital Section	40
3.42	A-D Analog Sequence Control Signals	40
3.43	Command Delays	40

Figure	Title	Page
3.44	Line Locking Timing Diagram	42
3.45	CMOS Data Bus : Key Select Coding	43
3.46	CMOS Data Bus : LED Select Coding	43
3.47	Display Driver Write Circuitry	44
3.48	Display Driver Read Mode Address States	44
3.49	Simplified Display Driver Read Circuitry	45
3.50	Simplified Diagram of IEEE Assembly	46
3.51	Simplified Diagram of BCD Interface Assembly	47
3.52	Line Transformer	48
3.53	Flowchart of Self Test Routine	49
4.1	Reference Selection Voltages	53
4.2	AC Board Output Selection Voltages	54

SECTION 1

CALIBRATION

1.1 INTRODUCTION

1.1.1 General

The purpose of calibration is to take account of any long-term drifts in the components of the instrument and to restore the accuracy, traceable to a known standard.

The period between calibrations depends upon the accuracy performance required from the instrument and for guidance, guaranteed accuracies for 24 hours, 90 days and 1 year are quoted.

The calibration procedures presented in the following pages should cater for most calibration situations. If, however, a special problem arises, please contact our Customer Service Section.

1.1.2 The Essentials for Good Calibration

Temperature - So that the instrument can meet its specification over the quoted temperature range, the temperature environment should be stabilised at 23°C ±1°C. In addition, temperature gradients around the instrument should be considered, therefore calibrate the instrument in its normal operating position and allow plenty of room for ventilation.

Warm up - It is essential that the instrument has fully temperature stabilised if the best results from calibration are to be achieved. Therefore, at least a 2 hour warm-up period is recommended during which time the line supply or the covers should not be removed even for a short period. In addition, if the covers have been removed, make certain that they are correctly fitted and that the leaf contacts to the Earth and Guard Shields are in good shape.

Calibration Source - To perform a useful calibration the accuracy of the source should always be at least four times that of the instrument being calibrated. In most cases, examples of likely sources are given for each calibration function.

With some calibration sources, the output may take several seconds to settle to a final value, therefore unless a shorter settling time is assured, a period of 10 seconds is recommended before each calibration operation.

Guarding - It is preferable to arrange for the DVM to be calibrated with 'Local Guard' selected. Furthermore to arrange for the 'Lo' terminal of the DVM to remain at 'earth' throughout and let the calibration source float. If a 'Remote Guard' connection is necessary then examples are shown in the Operating Manual.

1.1.3 The 'AUTOCAL' Process

1.1.3.1 General

The Datron 'AUTOCAL' process means that complete calibration of AC, DC, Ohms and Current on every range can be carried out from the instruments own front panel. In the process, an internal non-volatile memory stores calibration constants for each function and range as determined when the instrument takes a series of 16 readings of the applied calibration source. Internally, each of the readings is deviated by one sixteenth of a digit and when an average is taken, the instrument is able to resolve to better than one least significant digit displayed.

Access to the non-volatile memory is gained using a key inserted into the rear panel. When calibration is complete, the key is removed, therefore preventing accidental or unauthorised use of the calibration routine.

1.1.3.2 Procedure Outline

- Select the 'FUNCTION' and 'RANGE' to be calibrated and cancel any 'MODE' or 'COMPUTE' keys.

- Cover the 'COMPUTE' keys with the stick-on 'CALIBRATE' overlay provided. Insert the key into the 'CALIBRATE ENABLE' keyswitch on the rear panel and turn to the 'CAL' position. (The 'cal' legend will be displayed on the front panel.)

If the instrument is fitted with Option 50 IEEE Bus, set the rear panel address switch to 31 i.e. all 1's.

- Connect the calibration source to the input terminals and operate the keys shown in the tables in the following pages. When a 'CALIBRATE' button is operated, its associated L.E.D. indicator will light and extinguish when the calibration operation is executed.

- When all calibration is complete turn the keyswitch to 'RUN' and remove the key.

1.1.3.3 The Five 'AUTOCAL' Keys

'Zero' - This takes account of offsets in the instrument and in the calibration source.

'Gain' - This sets a scaling factor for each range and function.

'Ib' - This nulls the input bias current of the DC voltage measurement circuits to around 10pA. Therefore it only has a significant effect on the low DC voltage ranges and high resistance Ohms ranges. It can be operated as often as required and independently of other calibration operations. It will be seen that successive operations of 'Ib' approach the final nulled value of current iteratively.

'AcHf' - This flattens the response of the A.C. amplifier used for AC voltage measurement. It should only be used when a full calibration i.e. 'Zero', 'Gain' and 'AcHf' is carried out. As with 'Ib' the calibration action is iterative and requires several operations of the key to complete.

'Lin' - This is an important calibration operation as it optimises the basic linearity of the internal measurement circuitry used for all ranges and functions. It must be used before any DC voltage or Ohms calibration is carried out.

1.1.3.4 'AUTOCAL' using 'KEYBOARD'

This is an extension of the 'AUTOCAL' process which is useful when using a calibration source set to a nominal value but with known errors. This means for example that calibration directly to a standard cell is possible. A full explanation of the procedure is covered in section 1.7.

1.1.3.5 'AUTOCAL' over the Bus

Each of the five calibration operations can be controlled using Option 50, the IEEE bus. This means that the instrument can be entirely calibrated remotely or under program control. As mentioned in the 'Procedure Outline' for a manual calibration, the rear panel address switch should be set to 31, i.e. all 1's. When a bus calibration is required the address switch must be set to the address number assigned to the DVM in the system. More details of calibration with the bus are included in section 1.8.

1.1.3.6 'Error 4'

If during calibration 'Error 4' is displayed, this indicates that the Calibration Source deviates too far from the calibration span of the instrument. Under these circumstances, the calibration memory is not updated and the instrument goes into 'Hold' with the calibration button calibration key LED remains on.

In the case of 'Zero', 'Gain' or 'AcHf' the Calibration Source should be checked and the same 'CALIBRATE' key repressed. The 'Hold' mode may be released any time and the instrument will free run again. If 'Error 4' follows 'Ib' or 'Lin' or persistently appears following 'Zero', 'Gain' or 'AcHf' then an instrument failure may have occurred. Therefore either consult our Customer Service Section or the Servicing Section of this Handbook.

1.2 DC VOLTAGE CALIBRATION

1.2.1 General

The procedure in the table opposite is all that is necessary to completely 'AUTOCAL' the DC voltage function. Steps 1 and 2 affect the accuracy on all ranges and should therefore be carried out even if just one range is being calibrated.

On each range a 'Zero' and 'Gain' calibration is required for each polarity of input. The two 'Zero' calibrations are included to overcome a possible zero difference with the polarity setting of the DC calibration source.

If the 'DVM Reading After Calibration' is not in accordance with the table, repeat operations of the same 'CALIBRATE' key are permissible. Where no tolerance is shown in this column, only the exact reading quoted with an occasional least significant digit showing is to be expected.

1.2.2 Equipment Required

- 1MΩ 'Lin' Source. This is a 1MΩ 5% resistor in parallel with a 1nF capacitor, shielded to reduce noise interference.

- 10MΩ 'Ib' Source. This is a 10MΩ 5% resistor in parallel with a 1nF capacitor, shielded to reduce noise interference.

Datron products, number 400391 and 400392, are available as 'Lin' and 'Ib' sources and are recommended.

- A DC Calibration Source. e.g.:— Fluke 332D with a 100:1 (5ppm) divider for producing a 100mV source.

1.2.3 Checking Accuracy after 'AUTOCAL'

To check the accuracy after 'AUTOCAL' the 'Specification Verification' section of the User's Handbook will be useful; it provides tables for quick reference of accuracy on all ranges and functions in displayed digits.

DC VOLTAGE CALIBRATION

Step	Calibration Operation	Calibration Source Output	DVM Setting	'CALIBRATE' Key	DVM Reading After Calibration	Remarks
1	Linearity	1MΩ Lin Source	DC,1	'Lin'	<10 digits	This calibration step may take around 30 seconds to complete
2	Input Bias Current	10MΩ Ib Source	DC,.1	'Ib'	<100 digits	Each subsequent operation of 'Ib' should approximately halve the DVM reading
3	10V Range Zero	+0.0000V	DC,10	'Zero'	±0.0000V	
4	10V Positive Full Range	+10.0000V	DC,10	'Gain'	+10.0000V	
5	10V Range Zero	−0.0000V	DC,10	'Zero'	±0.0000V	
6	10V Negative Full Range	−10.0000V	DC,10	'Gain'	−10.0000V	
7	1V Range Zero	+0.00000V	DC,1	'Zero'	±.00000V	
8	1V Positive Full Range	+1.00000V	DC,1	'Gain'	+1.00000V	
9	1V Range Zero	−0.00000V	DC,1	'Zero'	±.00000V	
10	1V Negative Full Range	−1.00000V	DC,1	'Gain'	−1.00000V	
11	.1V Range Zero	+0.000mV	DC,.1	'Zero'	±0.000mV ±1 digit	Wait for the reading to stabilize before operating 'Zero'
12	.1V Positive Full Range	+100.000mV	DC,.1	'Gain'	+100.000V ±1 digit	
13	.1V Range Zero	−0.000mV	DC,.1	'Zero'	±0.000mV ±1 digit	Wait for the reading to stabilize before operating 'Zero'
14	.1V Negative Full Range	−100.000mV	DC,.1	'Gain'	−100.000V ±1 digit	
15	100V Range Zero	+0.000V	DC,100	'Zero'	±0.000V	
16	100V Positive Full Range	+100.000V	DC,100	'Gain'	+100.000V	
17	100V Range Zero	−0.000V	DC,100	'Zero'	±0.000V	
18	100V Negative Full Range	−100.000V	DC,100	'Gain'	−100.000V	
19	1000V Range Zero	+0.00V	DC,1000	'Zero'	±0.00V	
20	1000V Positive Full Range	+1000.00V	DC,1000	'Gain'	+1000.00V	ϟ Lethal voltages present - increase calibration source in 100V steps if possible
21	1000V Range Zero	−0.00V	DC,1000	'Zero'	±0.00V	
22	1000V Negative Full Range	−1000.00V	DC,1000	'Gain'	−1000.00V	ϟ Lethal voltages present - increase calibration source in 100V steps if possible

1.3 OHMS CALIBRATION

1.3.1 General

The procedure in the table opposite is all that is necessary to completely 'AUTOCAL' the Ohms function. If just the Ohms or just one range of the Ohms is to be calibrated, then steps 1 and 2 in the DC Voltage Calibration table should be carried out first. Then on each Ohms range just a 'Zero' and 'Gain' calibration is required.

If the 'DVM Reading After Calibration' is not in accordance with the table, repeat operations of the same 'CALIBRATE' key is permissible to improve the reading. Where no tolerance is shown in this column, only the exact reading quoted with an occasional least significant digit showing is to be expected.

1.3.2 'Zero' Resistance Source

For accurate 'Zero' calibration on Ohms it is ESSENTIAL that a correctly connected zero source is used. Two arrangements are necessary as shown in Fig. 1.1; it can be seen that '4 wire Ω' selection is recommended on all ranges.

1.3.3 Equipment Required

A set of resistance standards from 10Ω to 10MΩ in decades; it is essential that 10Ω to 100kΩ standards are 4 terminal devices.

1.3.4 Checking Accuracy after 'AUTOCAL'

To check the accuracy after 'AUTOCAL' the 'Specification Verification' section of the Operating Handbook will be useful. It provides tables for quick reference of accuracy on all ranges and functions in displayed digits.

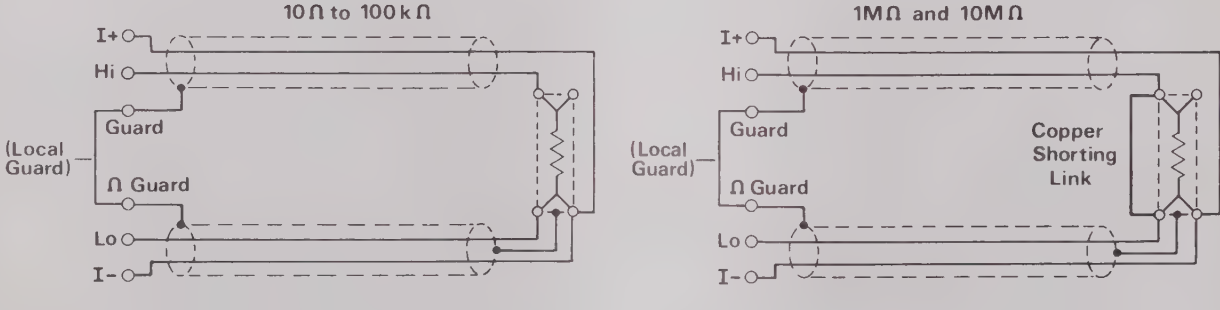


Fig. 1.1 ZERO RESISTANCE SOURCE CONNECTIONS

OHMS CALIBRATION TABLE

Step	Calibration Operation	Calibration Source	DVM Setting	'CALIBRATE' Key	DVM Reading After Calibration	Remarks
1	10Ω Range Zero	4 wire zero	kΩ, 4 wire, 10Ω	'Zero'	±0.0000Ω ±1 digit	Wait for the reading to stabilize before operating 'Zero'
2	10Ω Full Range	10Ω [1] Standard Resistor	kΩ, 4 wire, 10Ω	'Gain'	10.0000Ω ±1 digit	Wait for the reading to stabilize before operating 'Gain'
3	.1kΩ Range Zero	4 wire zero	kΩ, 4 wire, .1	'Zero'	±0.000Ω	
4	.1kΩ Full Range	100Ω [1] Standard Resistor	kΩ, 4 wire, .1	'Gain'	100.000Ω	
5	1kΩ Range Zero	4 wire zero	kΩ, 4 wire, 1	'Zero'	±.00000kΩ	
6	1kΩ Full Range	1kΩ [1] Standard Resistor	kΩ, 4 wire, 1	'Gain'	1.00000kΩ	
7	10kΩ Range Zero	4 wire zero	kΩ, 4 wire, 10	'Zero'	±0.0000kΩ	
8	10kΩ Full Range	10kΩ [1] Standard Resistor	kΩ, 4 wire, 10	'Gain'	10.0000kΩ	
9	100kΩ Range Zero	4 wire zero	kΩ, 4 wire, 100	'Zero'	±0.000kΩ	
10	100kΩ Full Range	100kΩ [1] Standard Resistor	kΩ, 4 wire, 100	'Gain'	100.000kΩ	
11	1000kΩ Range Zero	4 wire zero	kΩ, 4 wire, 1000 Input Filter	'Zero'	±0.00kΩ	
12	1000kΩ Full Range	1000kΩ [1] Standard Resistor	kΩ, 4 wire, 1000 Input Filter	'Gain'	1000.00kΩ ±1 digit	
13	10MΩ Range Zero	4 wire zero	kΩ, 4 wire, 10MΩ Input Filter	'Zero'	±0.0000MΩ	
14	10MΩ Full Range	10MΩ [1] Standard Resistor	kΩ, 4 wire, 10MΩ Input Filter	'Gain'	10.0000MΩ ±5 digits	

[1] - With Standard Resistor sources it may be useful to use the 'KEYBOARD' method of calibration - see section 1.7

1.4 AC VOLTAGE CALIBRATION

1.4.1 General

The procedure in the table opposite is all that is necessary to completely 'AUTOCAL' the AC voltage function. On each range just a 'Zero', 'Gain' and 'AcHf' calibration is required.

If the 'DVM Reading After Calibration' is not in accordance with the table, repeat operation of the same 'CALIBRATE' key is permissible to improve the readings. This will be necessary with the AcHf key.

1.4.2 Equipment Required

A copper shorting link and an AC calibration source e.g. Fluke 5200A and 5215A.

1.4.3 Checking Accuracy after 'AUTOCAL'

To check the accuracy after 'AUTOCAL' the 'Specification Verification' section of the Operating Handbook will be useful. It provides tables for quick reference of accuracy on all ranges and functions in displayed digits.

AC VOLTAGE CALIBRATION TABLE

Step	Calibration Operation	Calibration Source Output	DVM Setting	'CALIBRATE' Key	DVM Reading After Calibration	Remarks
1	DC coupled AC Zero	Copper Shorting link	AC,DC,.1	'Zero'	0.000mV ±3 digits	Set 'Local Guard'. Do not set 'Input filter'. Wait for reading to stabilize before operating 'Zero'
2	.1V Range Zero	Copper Shorting link	AC,.1	Check only	<100 digits	
3	1V Range Zero	Copper Shorting link	AC,1	'Zero'	.00000V ±1 digit	
4	10V Range Zero	Copper Shorting link	AC,10	'Zero'	0.0000V ±1 digit	
5	100V Range Zero	Copper Shorting link	AC,100	'Zero'	0.000V ±1 digit	
6	1000V Range Zero	Copper Shorting link	AC,1000	'Zero'	0.00V ±1 digit	
7	10V Full Range LF	10V rms 500 Hz	AC,10 Input Filter	'Gain'	10.0000V ±1 digit	Select 'Input filter' for remaining steps
8	10V Full Range HF	10V rms 30 kHz	AC, 10 Input filter	'AcHf'	10.0000V ±5 digits	
9	1V Full Range LF	1V rms 500Hz	AC,1 Input filter	'Gain'	1.00000V ±1 digit	
10	1V Full Range HF	1V rms 30 kHz	AC,1 Input filter	'AcHf'	1.00000V ±5 digits	
11	.1V Full Range LF	.1V rms 500 Hz	AC,.1 Input filter	'Gain'	100.000mV ±2 digits	
12	.1V Full Range HF	.1V rms 30 kHz	AC,.1 Input filter	'AcHf'	100.000mV ±5 digits	
13	100V Full Range LF	100V rms 500 Hz	AC,100 Input filter	'Gain'	100.000V ±1 digit	
14	100V Full Range HF	100V rms 30 kHz	AC,100 Input filter	'AcHf'	100.000V ±5 digits	
15	1000V Full Range LF	1000V rms 500 Hz	AC,1000 Input filter	'Gain'	1000.00V ±1 digit	↯ Lethal voltage present. - increase calibration source in 100V steps if possible
16	1000V Full Range HF	1000V rms 20kHz	AC,1000 Input filter	'AcHf'	1000.00V ±5 digits	↯ Lethal voltage present - increase calibration source in 100V steps if possible. DO NOT EXCEED 25 kHz

1.5 DC CURRENT CALIBRATION

1.5.1 General

The procedure in the table below shows all that is necessary to completely 'AUTOCAL' the DC Current function. If just the DC Current or just one range of DC Current is to be calibrated, then step 11 to 14 of the DC Voltage Calibration table should be carried out first. Then on each DC Current range just a 'Zero' and 'Gain' calibration is required.

If the 'DVM Reading After Calibration' is not in accordance with the table then repeat operation of the same 'CALIBRATE' key is permissible to improve the reading. Where no tolerance is shown in this column, only the exact reading quoted with an occasional least significant digit showing is to be expected.

1.5.2 Equipment Required

A DC Current calibration source.

1.5.3 Checking Accuracy after 'AUTOCAL'

To check the accuracy after 'AUTOCAL' the 'Specification Verification' section of the Operating Handbook will be useful. It provides tables for quick reference of accuracy on all ranges and functions in displayed digits.

DC CURRENT CALIBRATION TABLE

Step	Calibration Operation	Calibration Source Output	DVM Setting	'CALIBRATE' Key	DVM Reading After Calibration	Remarks
1	.1mA Range Zero	0.000μA	DC,I,.1	'Zero'	±0.000μA ±1 digit	Do not select 'Input filter'
2	.1mA Full Range	+100.000μA	DC,I,.1	'Gain'	+100.000μA ±2 digits	
3	1mA Range Zero	0.00000mA	DC,I,1	'Zero'	±.00000mA ±1 digit	
4	1mA Full Range	+1.00000mA	DC,I,1	'Gain'	+1.00000mA ±2 digits	
5	10mA Range Zero	0.0000mA	DC,I,10	'Zero'	±0.0000mA ±1 digit	
6	10mA Full Range	+10.0000mA	DC,I,10	'Gain'	+10.0000mA	
7	100mA Range Zero	0.000mA	DC,I,100	'Zero'	±0.000mA	
8	100mA Full Range	+100.000mA	DC,I,100	'Gain'	+100.000mA	
9	1000mA Range Zero	0.00mA	DC,I,1000	'Zero'	±0.00mA	
10	1000mA Full Range	+1000.00mA	DC,I,1000	'Gain'	+1000.00mA	

1.6 AC CURRENT CALIBRATION

1.6.1 General

The procedure in the table below shows all that is required to completely 'AUTOCAL' the AC Current function. If just the AC Current or just one range of AC Current is to be calibrated, then steps 1, 2, 11 & 12 of the AC Voltage Calibration table must be carried out first. Then on each range just a 'Zero' and 'Gain' calibration is required.

If the 'DVM Reading After Calibration' is not in accordance with the table then repeat operations of the same 'CALIBRATE' key is permissible to improve the reading.

1.6.2 Equipment Required

An AC Current calibration source at 1kHz.

1.6.3 Checking Accuracy after 'AUTOCAL'

To check the accuracy after 'AUTOCAL' the specification Verification section of the Operation Handbook will be useful. It provides tables for quick reference of accuracy on all ranges and functions in displayed digits.

AC CURRENT CALIBRATION TABLE

Step	Calibration Operation	Calibration Source Output	DVM Setting	'CALIBRATE' Key	DVM Reading After Calibration	Remarks
1	DC coupled AC Zero	No connections to DVM input terminals	I,DC,AC,.1	'Zero'	0.000μA ±5 digits	Do not select 'Input filter'
2	.1mA Range Zero	"	I,AC,.1	Check only	< ±100 digits	Cancel DC coupled
3	1mA Range Zero	"	I,DC,AC,1	'Zero'	.00000mA ±5 digits	
4	10mA Range Zero	"	I,DC,AC,10	'Zero'	0.0000mA ±5 digits	
5	100mA Range Zero	"	I,DC,AC,100	'Zero'	0.000mA ±5 digits	
6	1000mA Range Zero	"	I,DC,AC,1000	'Zero'	0.00mA ±5 digits	
7	.1mA Full Range	100μA, 1kHz	I,DC,AC,.1	'Gain'	100.000μA ±10 digits	
8	1mA Full Range	1mA, 1 kHz	I,DC,AC,1	'Gain'	1.00000mA ±10 digits	
9	10mA Full Range	10mA, 1 kHz	I,DC,AC,10	'Gain'	10,0000mA ±10 digits	
10	100mA Full Range	100mA, 1 kHz	I,DC,AC,100	'Gain'	100,000mA ±10 digits	
11	1000mA Full Range	1A, 1 kHz	I,DC,AC,1000	'Gain'	1000.00mA ±10 digits	

1.7 CALIBRATION USING 'KEYBOARD'

1.7.1 General

The 'KEYBOARD' method of calibration is useful when a calibration source although set to a nominal value has known errors. In this situation the known value of the calibration source can be entered into the DVM before the 'AUTOCAL' process is executed. The process is functional during any calibration with a source of magnitude between 20% and 200% of the range selected, but it should be noted that for equal magnitude source errors, calibrating at the lower percentage end of range produces a higher percentage calibration error. The 'KEYBOARD' method operates for both the 'Gain' and 'AcHf' calibration operations. An example using 'KEYBOARD' to calibrate directly against a Standard Cell is shown in the table below.

1.7.2 'KEYBOARD' with Negative Inputs

If the 'KEYBOARD' method is used on DC Voltage calibration with Negative polarity sources, it is important NOT to enter a negative sign with the keyed-in source value. The instrument itself can determine the polarity of the source and update the appropriate calibration memory location.

CALIBRATION EXAMPLE USING 'KEYBOARD'

Step	Calibration Operation	Calibration Source Setting	DVM Setting	'CALIBRATE' Key	DVM Reading After Calibration	Remarks
1	1V Range Zero	Short-circuit	DC,1	'Zero'	±.00000V	Short connecting leads at Standard Cell end
2	Connect Standard Cell	Standard Cell	KEYBOARD	–	0	
3	Enter Standard Cell Voltage	Standard Cell	1,·,0,1,8,1,6	–	+1.01816	
4	1V Range Calibration	Standard Cell	–	'Gain'	+1.01816	

1.8 'AUTOCAL' OVER THE BUS

All the calibration procedures covered in this manual can be carried out remotely using Option 50, the IEEE Bus.

Effectively, the five calibration keys are replaced by five Bus instructions and these are used instead of the 'CALIBRATE' keys listed in the Calibration tables on previous pages.

An example of calibration with the Bus is given in the table below. A complete program listing for the same calibration operation assuming an HP9825 controller is as follows:—

```
Ø: dim D$[15]          define 15 character string variable
1:  clr 728            send 'device clear' to DVM (interface 7, address 28)
2: wrt 728,"F3R3Q1W1="  program to DC 1V, SRQ Mode 1, Enable Cal.
3: Ø→S
4: wrt 728,"GØ="       program zero cal. trigger
5: oni 7,"srq"         jump to SRQ service routine on interrupt
6: eir 7,128           enable SRQ interrupts from interface 7
7: if bit ("Ø1XXXXXX",S) check status byte S
   =Ø;jmp -1           obtained by service routine
8: dsp "Apply 1V &     prompt operator to apply
   CONTINUE"           calibration source on completing zero cal
9: Ø→S;stp
10: wrt 728,"G1="      program gain cal. trigger
11: oni 7,"srq"
12: eir 7,128
13: if bit ("Ø1XXXXXX",S)
   =Ø;jmp -1
14: wrt 728,"TØWØ="    program to Internal Trigger, Disable Cal. on completion of gain cal.
15: lcl 728            program DVM to local state
16: stp
17: "srq":rds(728)→S   SRQ service routine to read status byte
18: red 728,D$
19: iret
*7717
```

CALIBRATION EXAMPLE USING THE BUS

Step	Calibration Operation	Calibration Source	DVM Setting	Bus Controller Instruction	DVM Reading After Calibration	Remarks
1	Set DVM to known state	—	In Remote State	'Device Clear'	—	Program DVM to predetermined state AØCØDXEØF3MØNØ OØPØQØR6SØT5
2	Set DVM to DCV, 1V Range, and prepare for calibration	+0.00000V	Calibration key to 'CAL'	'F3R3Q1W1='	—	Program DVM to Function: DC V (F3) Range: 1V (R3) SRQ Mode 1 (Q1) Enable Cal. (W1)
3	1V Range Zero	+0.00000V	In Remote State	'GØ='	±.00000V	Program 'Zero' cal., SRQ indicates when calibration operation completed
4	1V Positive Full Range	+1.00000V	In Remote State	'G1='	+1.00000V	Program 'Gain' cal., SRQ indicates when calibration operation completed
5	Set DVM to Internal Trigger, Disable Cal.	—	In Remote State	'TØWØ='	—	Program DVM to Internal Trigger (TØ), Disable Cal. (WØ)
6	—	—	In Local State, Calibration key to 'RUN'	'Local'	—	DVM in normal mode, free-running

SECTION 2

MECHANICAL DESCRIPTION

2.1 GENERAL

The 1061 has been designed to be either rack mounted in a standard 19" rack (3½" (2U) height required) or bench top/portable with integral tilt stand. An exploded view of the instrument is shown in Fig 2.1.

2.2 FRONT PANEL

The front panel incorporates the signal input terminals, range, function, mode, keyboard, compute and power switches and a numeric/legend gas discharge display.

2.3 REAR PANEL

The rear panel incorporates the mains supply, power input socket and fuses, digital and analog output sockets, rear and ratio signal input sockets, rear/front panel signal input selection switch, run/calibrate keyswitch, calibration interval (error) select switch and current option fuse.

2.4 EXTERNAL CONSTRUCTION

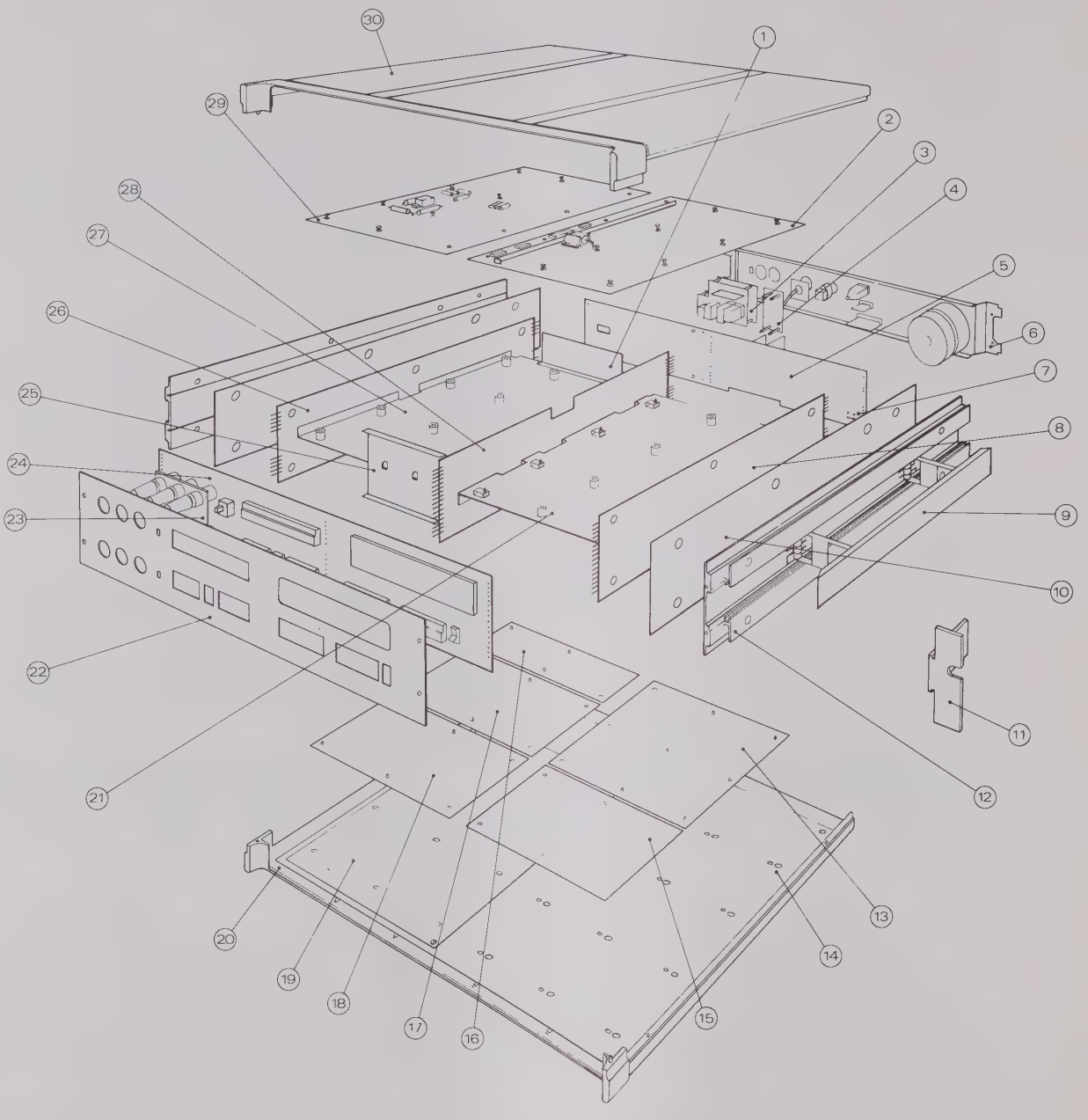
A screen printed key designation overlay adheres to the front panel retaining the polarising filter in front of the display. Both the front and rear panels are held together by two side extrusions running from front to rear. These side extrusions provide both slots for the handles or rack mounting 'ears' and locating points for the structural foam covers. The bottom cover is fitted with the tilt-stand, rubber feet and instruction card. Earth screening of the covers and guarding is provided by aluminium plates, heat-staked to the inside of the covers with electrical connections made by spring contacts.

2.5 INTERNAL CONSTRUCTION

An internal chassis is constructed from five printed circuit boards, held together by connectors at each corner and held rigid by two inner aluminium shields fixed horizontally on the instrument's centre line running from front to rear. Input terminals, switches and display are mounted on the front printed circuit board (pcb) and the power supply on the rear pcb. The two side and centre pcb's are used for interconnections between the main circuit boards.

All the main circuit boards are mounted on the inner shields with hinges and quick release fasteners with flexible connections to allow operation in the 'hinged-up' position. The Analog output circuitry is fixed on to the rear pcb of the chassis and the Ratio/Rear Input circuitry on to the rear panel. The options are mechanically fitted and require no soldering.

The chassis is mounted on to the side extrusions with nylon screws, spacers and an insulation sheet to ensure that the 'electrical spacings' of the BSI, UL and VDE specifications are achieved.



1. REAR GUARD SCREEN
2. DIGITAL ASSEMBLY
3. RATIO/REAR INPUT ASSEMBLY (OPTION)
4. ANALOG OUTPUT ASSEMBLY (OPTION)
5. REAR (POWER SUPPLY) PCB ASSEMBLY
6. REAR PANEL ASSEMBLY
7. POWER SUPPLY VOLTAGE SELECTION LINKS
8. R.H. PCB ASSEMBLY
9. HANDLE ASSEMBLY
10. INSULATION SHEET
11. RACK MOUNTING BRACKET
12. SIDE EXTRUSION
13. DIGITAL INTERFACE ASSEMBLY (OPTION)
14. EARTH SCREEN
15. DISPLAY DRIVER ASSEMBLY
16. CURRENT ASSEMBLY (OPTION)
17. AC ASSEMBLY (OPTION)
18. OHMS ASSEMBLY (OPTION)
19. OUTER GUARD SCREEN
20. BOTTOM COVER ASSEMBLY
21. R.H. CENTRE GUARD SCREEN
22. FRONT PANEL AND OVERLAY
23. TERMINAL SUPPORT PLATE
24. FRONT PCB ASSEMBLY
25. FRONT GUARD SCREEN
26. L.H. PCB ASSEMBLY
27. L.H. CENTRE GUARD SCREEN
28. CENTRE PCB ASSEMBLY
29. ANALOG ASSEMBLY
30. TOP COVER ASSEMBLY

FIG. 2.1 EXPLODED VIEW OF INSTRUMENT

SECTION 3

TECHNICAL DESCRIPTION

3.1 INTRODUCTION

The internal circuits of the basic DC only instrument are divided between five printed circuit board assemblies (shown in bold outline in Fig. 3.1).

For the purpose of explanation, each assembly will be described separately and each assembly further sub-divided according to the various functions involved.

3.2 ANALOG ASSEMBLY (Circuit Drawing No. 430328)

The Analog assembly is split into three distinct sections: (i) the Analog Interface, (ii) the DC Isolator and (iii) the Analog to Digital (A - D) Converter.

The Analog Interface receives data from the Digital assembly to control the selection, range scaling and other features of the analog circuitry. Messages between the Analog and Digital assemblies are passed via opto-isolators, electrically isolating one from the other.

The DC Isolator includes the preamplifier, range scaling circuits and bootstrapped supplies. The A - D section converts the scaled input signal to a time period proportional to the signal using a modified triple slope technique.

3.2.1 Analog Interface (430328 sheet 5)

3.2.1.1 Introduction

The Analog Interface provides electrical isolation between the Digital and Analog circuitry. Latched data from the microprocessor is passed through opto-isolators, decoded and latched again on an analog assembly to select function, range, test, average and the D - A converter set up conditions. A line is also provided to instruct the micro-processor which options are present and if the AC assembly is measuring a signal above 5kHz.

3.2.1.2 Power-On

At power-on the A - D converter is placed into the RESET condition (See Section 3.2.3.8). The analog circuitry is then interrogated to discern which options (if any) are fitted. Finally the analog circuitry is placed into the DC, 1000V range until a different range or function is selected (See Fig. 3.3).

To determine which options are fitted the Digital assembly sends a series of messages across the isolation barrier, decodes them on the analog side and gates them with lines from the option assemblies to feed a signal back across the isolation barrier to the micro-processor.

Looking at the procedure, in more detail, the Analog Interface Data (ID) lines are all set to a logic '1' except one, which is set to a logic '0', depending on the option being interrogated (See Fig. 3.2). As an example we will check to see if the AC option is fitted. ID1 is set low, the rest of the ID lines set high and the Analog Interface Address lines, IAØ and IA1 set low. The opto-isolators *invert* all signals, thus M17-3 is low and M19 pins 10, 4 and 11 are high. If the AC option is *not* fitted M19-2 is driven low via R55 from M17-3, causing M19-3 to be high, producing a logic '0' (−15 volts) on M18-4. If the AC option *is* fitted a 33kΩ resistor on the AC assembly (R14) overrides R55 and and a high is placed on M19-2. The effect is to produce a

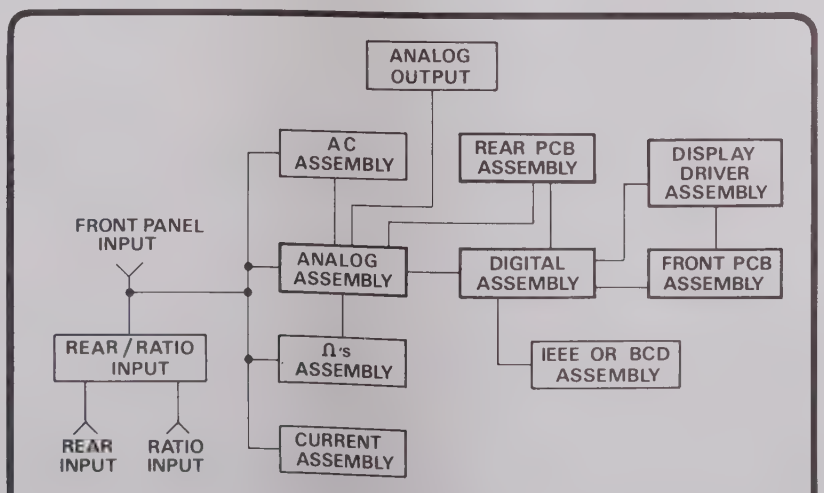


FIG. 3.1 PRINTED CIRCUIT BOARDS BLOCK DIAGRAM

Option checked	ID line low	Pin No. of M19 held low if Option incorporated
AC	ID 1	M19-3
Ω	ID 2	M19-11
I	ID 3	M19-4
RATIO	ID 4	M19-10

Fig. 3.2 POWER-ON OPTIONS FITTED TEST

high on M18-4, turning the opto-isolator M2-B on and thus COND. VAL (M2-8) is high, signalling to the Digital assembly that the AC option is fitted. Similarly, when the Ω, I or RATIO options are interrogated, the appropriate output of M19 is set low if the option is fitted causing the COND. VAL to be set high.

*Note: ID and IA lines
logic '1' ≡ +5 volts logic '0' ≡ 0 volts
AD lines
logic '1' ≡ 0 volts logic '0' ≡ --15 volts

The next step in the power-up sequence as far as the analog circuits are concerned, is to be placed into the DC, 1000V range (See Fig. 3.3 Flowchart). Firstly, all assemblies are deselected by placing logic '1's on all the ID lines, then setting the IAØ and IA1 lines low (see Fig. 3.4), clocking the option selects latches (M20 Analog assembly, M5 AC assembly, M9 Ohms assembly, M1 Ratio assembly from M17-3. Both IA lines then return high.

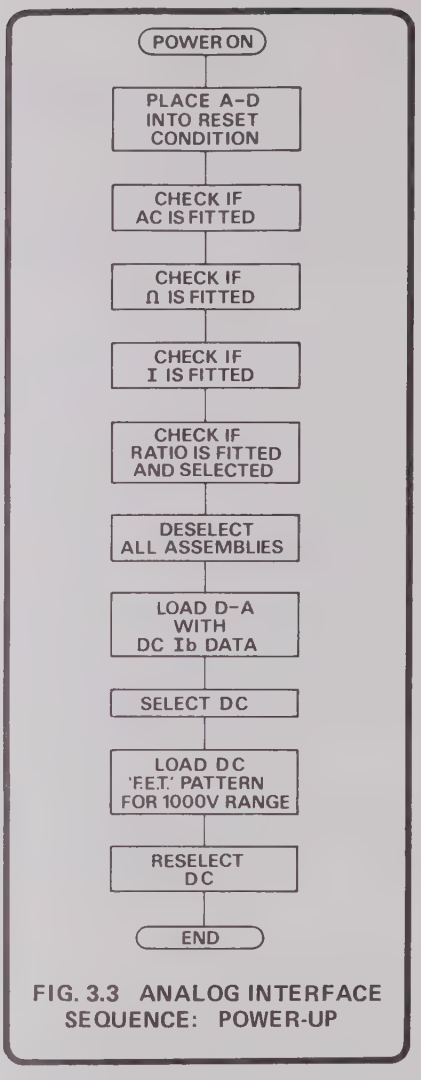

POWER ON
PLACE A-D INTO RESET CONDITION
CHECK IF AC IS FITTED
CHECK IF Ω IS FITTED
CHECK IF I IS FITTED
CHECK IF RATIO IS FITTED AND SELECTED
DESELECT ALL ASSEMBLIES
LOAD D-A WITH DC Ib DATA
SELECT DC
LOAD DC 'F.E.T.' PATTERN FOR 1000V RANGE
RESELECT DC
END

FIG. 3.3 ANALOG INTERFACE SEQUENCE: POWER-UP

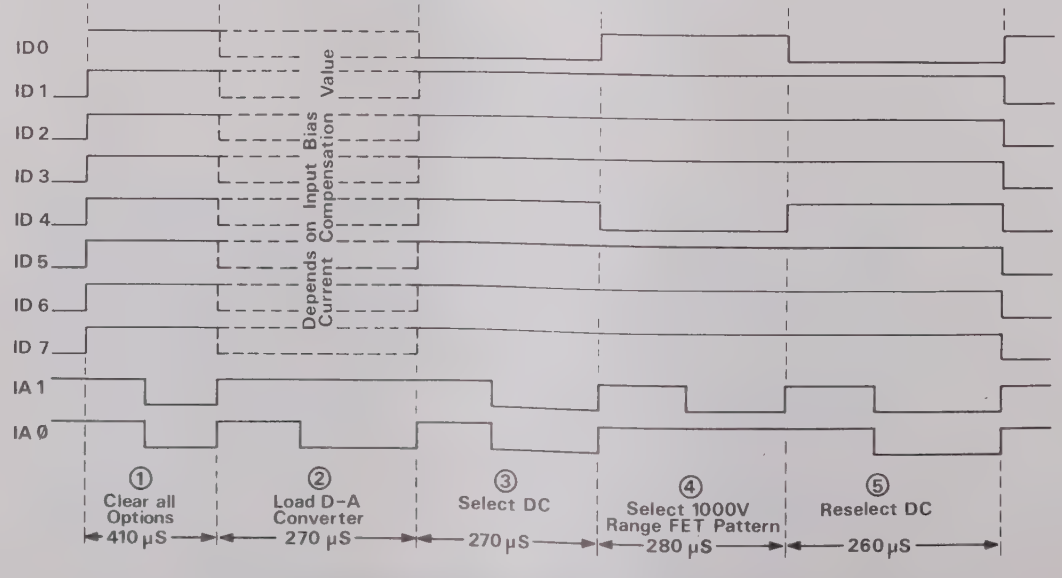


FIG. 3.4 ANALOG INTERFACE DATA LINE TIMING DIAGRAM (POWER-UP)

Secondly, the latches of the D - A converter (M13, M14) are set up with the input bias current (Ib) compensation data. The ID lines are set to the appropriate pattern and the information is clocked on to M13 and M14 by a delayed low to high edge from M17-4, originating from IAØ going low. The delay makes sure that the signal from M17-10 has disabled the "F.E.T." latch M21. Once again, the IAØ line returns to the resting state of logic '1'. Thirdly, the DC analog circuits are enabled by setting all the ID lines high except for ID0, then clocking M20 by a low to high edge from M16-6 caused by both IA lines going low. Once DC has been selected, the F.E.T. pattern latch is enabled from M12-1, and the penultimate step is to load this latch with 1000V range data from the ID lines (ID4 low, the rest high). This is executed by clocking the 'F.E.T.' latch from M17-4 once again, but this time being due to IA1 going low. The final step is to reselect DC as described above.

3.2.1.3 General Interface Update Sequence

Before the start of each reading, the analog interface undergoes a complete update. The series of events is the same as the power-up sequence for selection of function and range, as can be seen by comparing the two flowcharts (Figs. 3.3 and 3.5). When Ohms or Current is selected, the DC Isolator or AC assembly is also used in the measurement procedure as seen in the following table.

Type of Measurement	Circuits Selected	Use of D - A
DC Volts	Analog Assembly	Input Bias Current Compensation
AC Volts	AC Assembly	Frequency Compensation
AC + DC Volts	AC Assembly	Frequency Compensation
Resistance	Ohms Assembly and Analog Assembly	Input Bias Current Compensation
DC Current	Current Assembly and Analog Assembly	Input Bias Current Compensation
AC Current	Current Assembly and AC Assembly	Frequency Compensation
AC + DC Current	Current Assembly and AC Assembly	Frequency Compensation

The update sequence order is (i) Deselect all assemblies, (ii) Load D - A latches, (iii) Select AC assembly or DC Isolator, (iv) Load range pattern into DC or AC range latches, (v) Deselect DC or AC and select either the Ohms or Current assembly, (vi) Load range pattern into Ω's or I range latches, (vii) Reselect circuits selected in (iii) and (iv).

Note: Steps (v) and (vi) are used only when I or Ω is selected.

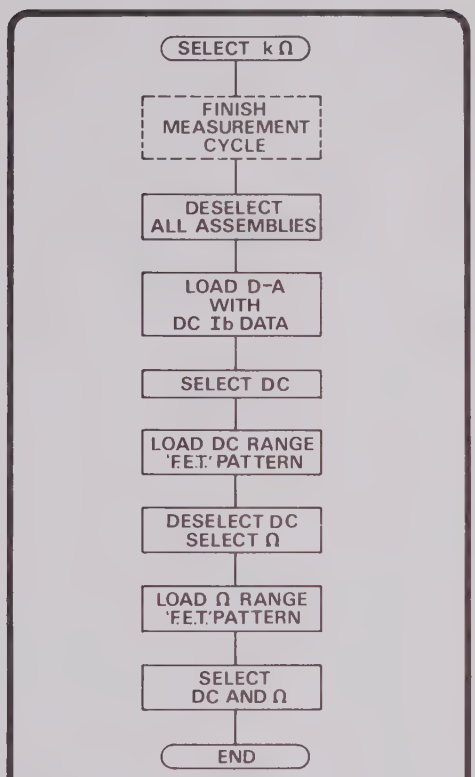


FIG. 3.5 ANALOG INTERFACE SEQUENCE: OHMS SELECT

Flowchart 3.5 gives the above sequence for an ohms update. The general form of the timing diagram for the above sequence is given in Fig. 3.6, the analog 'F.E.T.' patterns for each range of each function being given in Appendix 1.

3.2.1.4 Test

When TEST is selected, a logic '0' is placed on ID7 at stages (iii), (v) and (vii) in Fig. 3.6, i.e. each time a function measurement circuit is selected. Appendix 1 lists the 'F.E.T.' patterns of each assembly for each test measurement cycle.

3.2.2 DC Isolator Section

3.2.2.1 Preamplifier Scaling (430328 sheet 1)

Figure 3.8 shows the essential features of the isolator scaling circuit. For the purpose of explanation the same symbols are used, regardless of whether the switching is accomplished electronically (F.E.T.) or by means of relay contacts. In Fig. 3.8 all switches are shown in the 1V RANGE position.

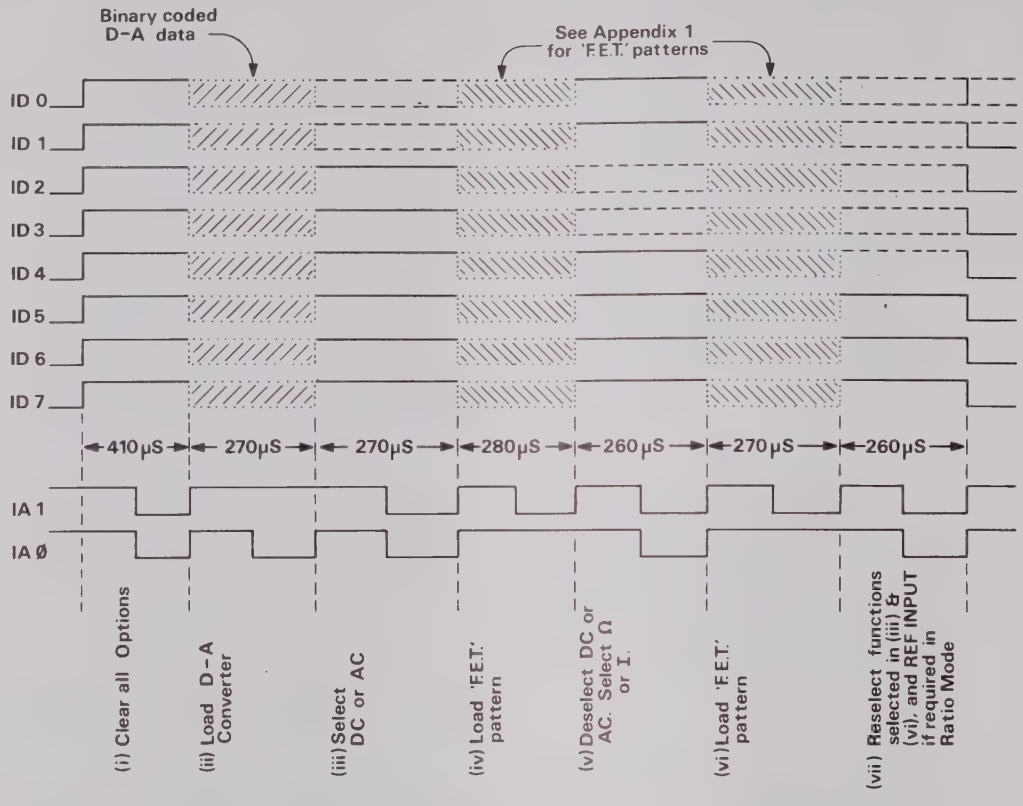


FIG. 3.6 GENERAL FORM OF ANALOG INTERFACE UPDATE TIMING DIAGRAM

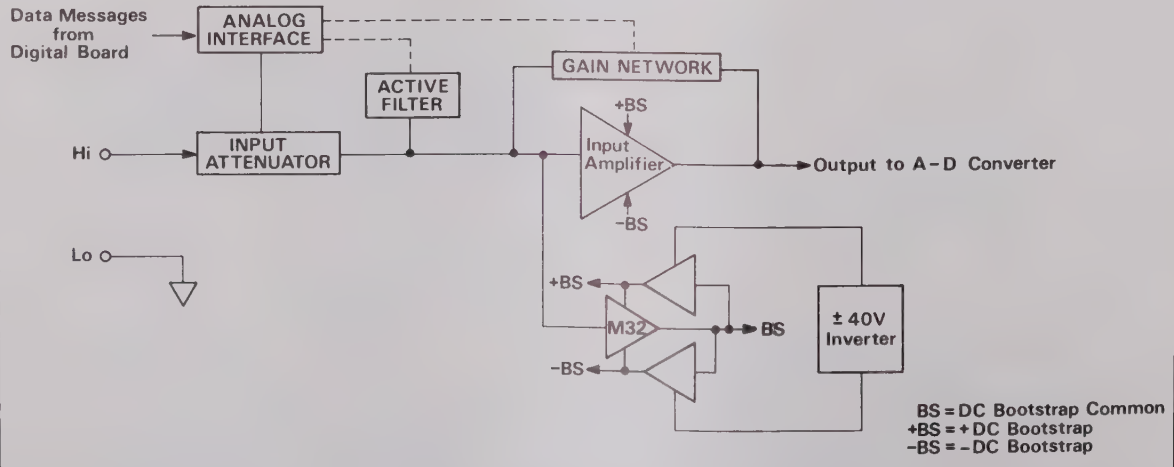


FIG. 3.7 SIMPLIFIED DIAGRAM OF DC ISOLATOR

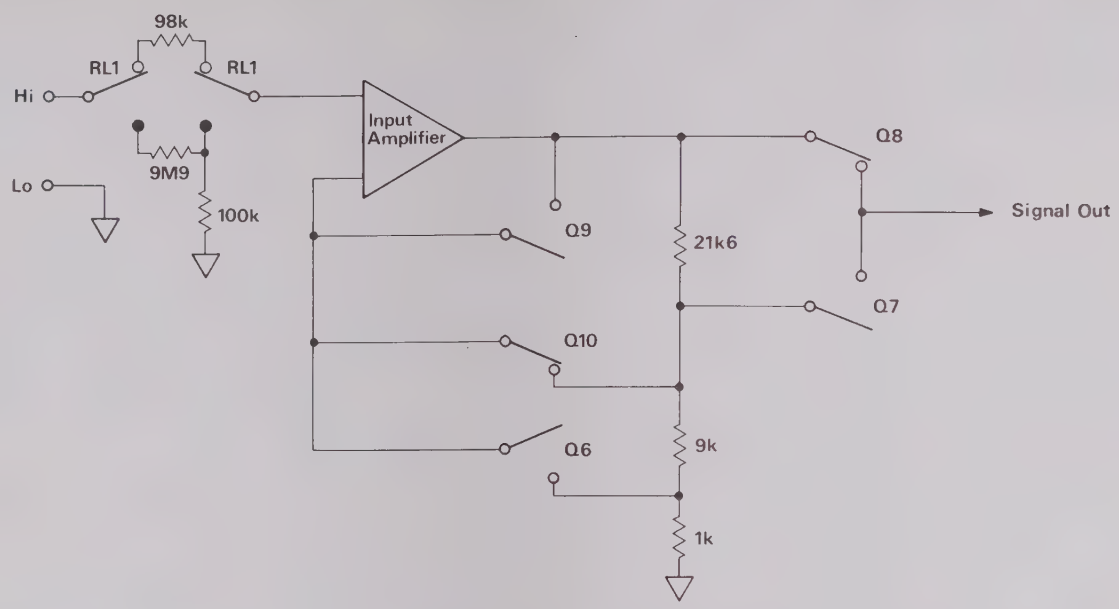


FIG. 3.8 SIMPLIFIED DIAGRAM OF ISOLATOR SWITCHING

The various switching combinations for the different ranges are as follows:—

Range	Gain	Q6	Q7	Q8	Q9	Q10	RL1
100mV	x31.6	ON	OFF	ON	OFF	OFF	ON
1V	x3.16	OFF	OFF	ON	OFF	ON	ON
10V	÷3.16	OFF	ON	OFF	ON	OFF	ON
100V	÷31.6	OFF	OFF	ON	OFF	ON	OFF
1000V	÷316	OFF	ON	OFF	ON	OFF	OFF
$\overline{DC}$		OFF	OFF	OFF	ON	OFF	OFF

The configuration of the circuit for each range is shown in Fig. 3.9.

Reference should be made to circuit diagram number 430328, sheet 1, for the complete circuit. Sheet 2 gives tables of the coding on the input control lines (from the Analog Interface).

When the 100V or 1kV range is selected, a ÷100, 10MΩ input attenuator (R143, R156, R149, R148) is incorporated into the circuit. This is a matched set of resistors for low temperature coefficient. The selection of a lower range energizes relay RL1 (via Q33), causing resistor chain R119-R122 to be in series with the Hi input. Should an overload signal then be applied, the resistor chain limits the current and the power dissipation is such that 1000V can be applied continuously.

The amplifier end of the resistors is clamped by zener diodes D22, D23 and Q18, Q19 to low, thus the amplifier input can never exceed approximately ± 24 volts.

The output from the DC Isolator, test point (TP13) is approximately 3.16 volts ($\approx\sqrt{10}$) for a full range (100,000) input by the following methods (See Fig. 3.9):—

100mV Range Q6 and Q8 are turned on; all other F.E.T.'s are turned off and RL1 energised. Thus the output of the amplifier is connected to its inverting input via R108, R109, R110, R111 and Q6, an attenuator chain of ÷31.6, giving the amplifier an overall gain of X 31.6 Q8 connects the preamplifier directly to the output.

1V Range Q10 and Q8 are turned on, all other F.E.T.'s are turned off and RL1 energised. The output of the amplifier is connected to its inverting input via R108, R109, R110, R111 and Q10, an attenuator chain of ÷3.16, giving the amplifier an overall gain of X 3.16. Q8 connects the preamplifier directly to the output.

10 V Range Q9 and Q7 are turned on; all other F.E.T.'s are turned off and RL1 energised. Q9 causes the amplifier output to be directly connected to its inverting input, giving a gain of unity. The output of the amplifier is attenuated by 3.16 (R114, R115) before being passed to the output via Q7 instead of Q8.

100V and 1000V Ranges These two ranges select the 1V and 10V ranges respectively but a ÷100 attenuator (R149, R156, R143, R148) is inserted between Hi and the preamplifier input when RL1 is de-energised.

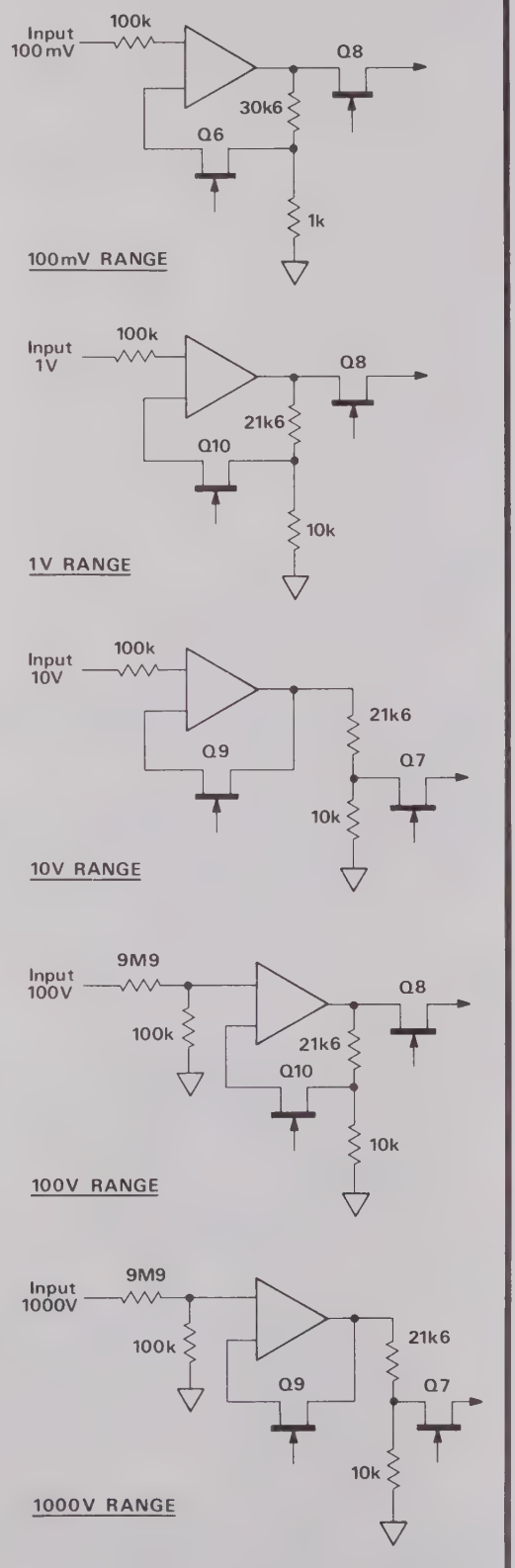


FIG. 3.9 PREAMPLIFIER GAIN CIRCUITS

3.2.2.2 Preamplifier (430328 sheet 1)

The preamplifier is designed to present an input impedance of greater than 10,000MΩ for signals up to ± 20 volts. It is also bootstrapped (tracking of both ground lines and supply voltages with input signal) being essential for correct operation of input bias compensation, temperature compensation and common mode rejection.

Q12 is a well matched monolithic NPN transistor pair exhibiting minimal voltage drift and low noise characteristics, the output being buffered by M31. To compensate for the current gain drift of Q12 (approx. −1%/°C), the change in the base-emitter voltage of one half of Q12 is sensed by M30. The drift compensation is linearised to 1%/°C by thermistor R218. Thus the input bias current is kept constant with temperature.

3.2.2.3 D.C. Bootstrap (430328 sheet 2)

Bootstrapped supplies are generated which track the input signal directly (BS), track the input signal with a positive offset of +12V(+BS) and track the input signal with a negative offset of −12(−BS).

M32 is the high inpedance buffer which tracks the inverting input of the preamplifier. The offset of M32 is adjusted so that its input is within 100μV of the input of the preamplifier. M32 thus functions as the low impedance rail (BS) following the input signal.

Selection of DC(M20-3) enables the capacitive inverter driven from M33 to provide an unregulated +42V(TL4) and −42V(TL5) supply from the ±15V supply.

The positive bootstrap supply (+BS) is generated as a current source comprising Q26 and the shunt regulator, Q27, referenced to D50. When the output voltage of the regulator is approximately 1.2 volts above D50 cathode, Q27 conducts current into R175. Since the current in R175 is controlled to be constant by Q30, referenced to D50, the curremt flowing through R174 is reduced. Hence the supply current, "mirrored" in R173, is reduced and the output voltage controlled.

The negative bootstrap supply (−BS) is generated in a similar manner. Thus bootstrapped supplies of approximately ±12 volts are produced, tracking the input signal exactly.

3.2.2.4 Filtering (430328 sheet 1)

Selection of filter causes an active filter to be switched in by relay, R12, (via Q32). The filter gives an attenuation of −34 dB at 50Hz. The essential components of the filter are shown in Fig. 3.10.

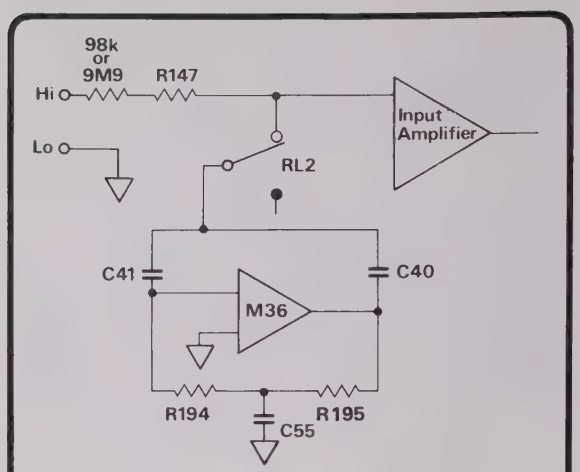


FIG. 3.10 SIMPLIFIED DC ISOLATOR FILTERING CIRCUIT

3.2.2.5 Input Current (Ib) Compensation (430328 sheets 1 and 5)

During the calibration cycle, the microprocessor notes and stores the zero error due to the bias current (measured in a known source resistor). When DC is selected, this information is recalled by the microprocessor, transferred across the isolation barrier and latched into M13 and M14, see Fig. 3.11.

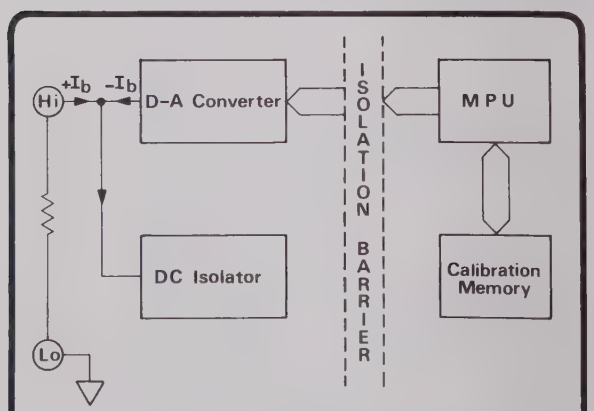


FIG. 3.11 SIMPLIFIED DIAGRAM OF BIAS CURRENT COMPENSATION

The output from the latches is applied to the binary resistor ladder network, AN2, providing a 255 step digital to analog conversion. The analog signal is applied to the inverting input of M3 so that the output drives current, through the diode, to control the current in the corresponding transistor of the opto-isolator, M23. The transistor of the opto-isolator sinks current to the −15V supply until the voltage across R198 is equal to the voltage applied to the inverting input of M3.

The other half of the opto-isolator acts as a current mirror, referenced to the bootstrap (BS) supply. Thus the input current correction is floated on the bootstrap supply, tracking the input signal is divided by R84 to R128 and R129 to null the bias current of the preamplifier.

3.2.2.6 Test (430328 sheets 1 and 5)

During the self-test routine, (actuated from the front panel or remotely programmed) the DC isolator is checked for correct operation. The circuitry is placed into the 0.1V range, as described in 3.2.1.3, except that relay RL1 is not energized, (i.e. the ÷ 100 attenuator is across the input amplifier). Filter is selected and F.E.T. Q5 'closed' via M20-5 causing a small signal to be injected into the feedback path of the input amplifier. Thus a signal of −3.125 volts is output from the DC Isolator (TP13). This signal is then measured and compared with a stored value. If the measured signal is within ±6% of the stored value, the test continues with a 1V range check and a 10V range check.

Range	Output signal from DC Isolator (TP13)
0.1V	− 3.125 volts
1V	− 0.2193 volts
10V	− 0.06932 volts

DC Isolator Output Test Voltages

3.2.3 Analog to Digital Conversion (Analog Section) (430328 sheets 3 and 4)

3.2.3.1 General Principles

Section 3.2.4 and Fig. 3.2 of the User's Handbook gives a very basic description of the principles of the integration involved. The technique used in the Autocal Voltmeter is a quadruple slope, the two extra slopes being towards the end of the signal and reference integration periods respectively.

Fig. 3.12 is a simplified diagram showing the essentials of the analog section of the A - D conversion and should be used with timing diagram Fig. 3.13 for full appreciation of the circuit operation.

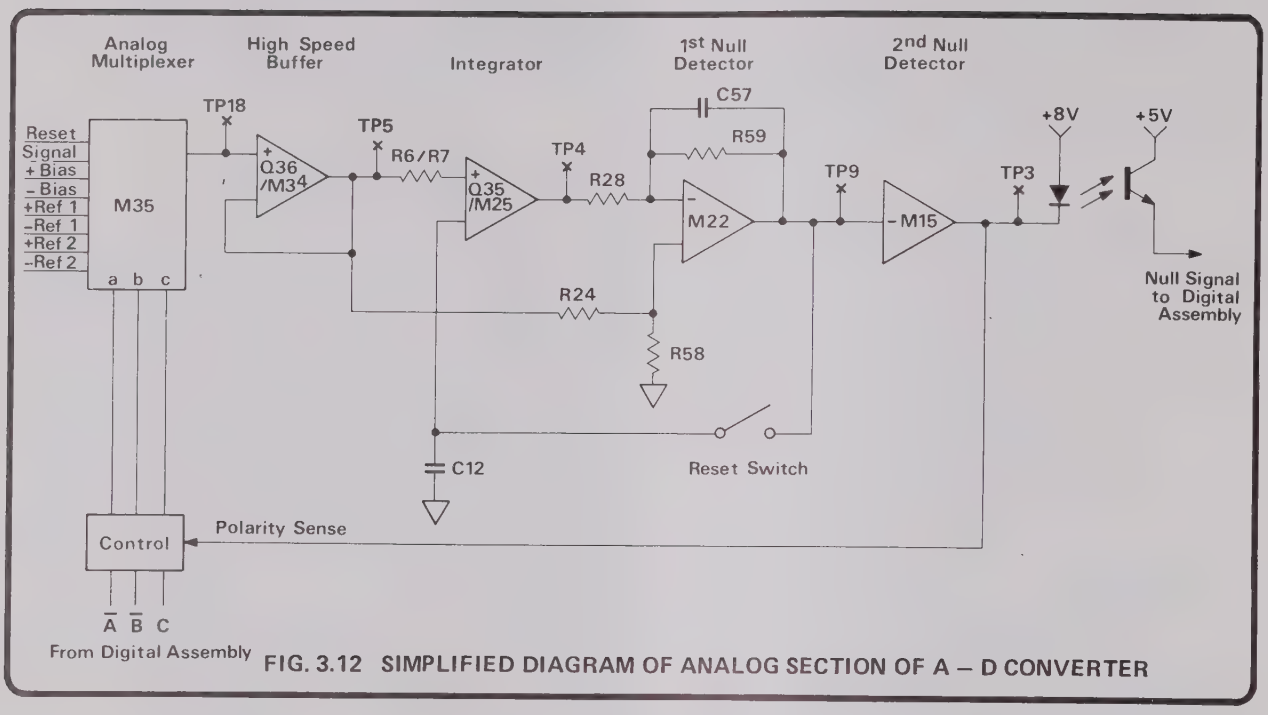


FIG. 3.12 SIMPLIFIED DIAGRAM OF ANALOG SECTION OF A – D CONVERTER

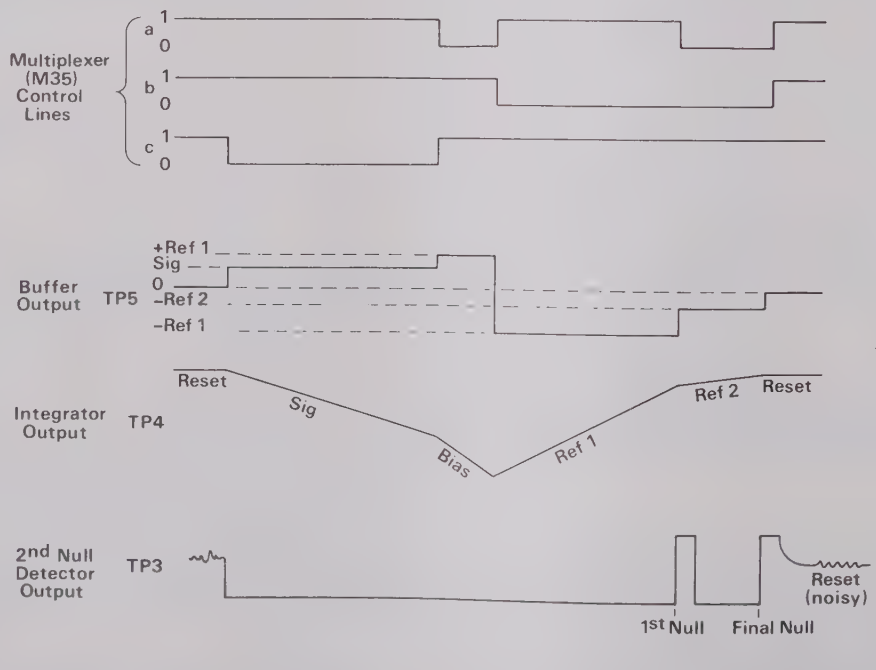


FIG. 3.13 TIMING DIAGRAM FOR ANALOG SECTION OF A – D CONVERTER
(Positive Signal)

3.2.3.2 A - D Input Control

The analog signal from the DC Isolator is applied to the analog multiplexer (M35) and fed to the input of the buffer (Q36/M34). This in turn feeds the signal to the integrator comprising of Q35, M25 and C9.

Control of the multiplexer is derived from the Digital assembly via opto-isolators M4, M5 and M6. These signals control the sequence of events, allowing first the signal, then a bias voltage of the same polarity as the signal, followed by opposite polarity reference and reference ÷16 signals to the buffer and integrator. The multiplexer is then placed in a reset condition ready for the next measurement cycle. Fig. 3.14 gives the multiplexer control line sequence for both positive and negative signals.

STATE	a	b	c	STATE	a	b	c
RESET	1	1	1	RESET	1	1	1
SIG	1	1	0	SIG	1	1	0
+ BIAS	0	1	1	−BIAS	0	1	0
−REF 1	1	0	1	+REF 1	1	0	0
−REF 2	0	0	1	+REF 2	0	0	0
RESET	1	1	1	RESET	1	1	1
	Positive signal				Negative signal		

Logic levels : (0 ≡ −8V, 1 ≡ +8V)

Fig 3.14 MULTIPLEXER CONTROL LINE SIGNALS

3.2.3.3 Reference Voltages and Control Logic Power Supply

REF 1 : The two halves of M39 in conjunction with zener diodes D60 and D59 form the positive and negative reference voltages respectively, D65 and D64 being 'start-up' diodes (see Fig. 3.15). The outputs of M39 (+11 and −11 volts) supply the defined current for the reference zeners via R212 and R38 respectively. R19 and R18 are selected by Datron so that each zener has zero voltage/temperature coefficient.

The resistor chains R41-R43 and R88-R90 are binary weighted values allowing the set up of the exact nominal REF 1 voltages, of ±6.42V, by cutting the appropriate links.

REF 2 : The second reference is 1/16th of REF 1. The positive and negative REF 1 voltages are divided by R71, R68 and R214, R70 respectively.

The power supplies for the logic circuits M35, M29, M27, M28 and opto-isolators M1, M4, M5 and M6 are also derived from M39 via zener diodes D61 and D62, giving supply voltages of ±8 volts.

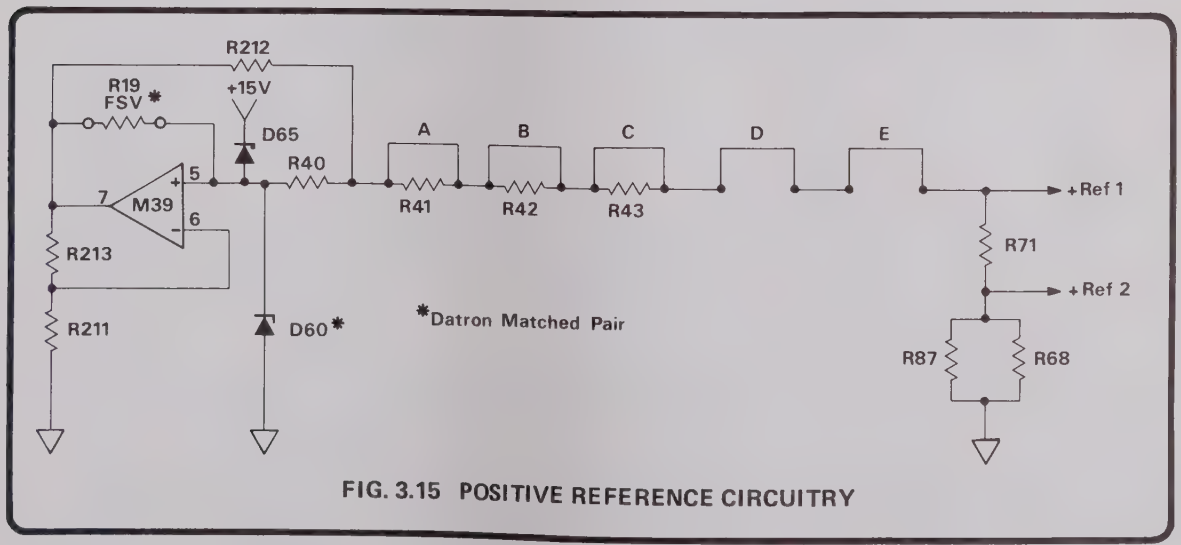


FIG. 3.15 POSITIVE REFERENCE CIRCUITRY

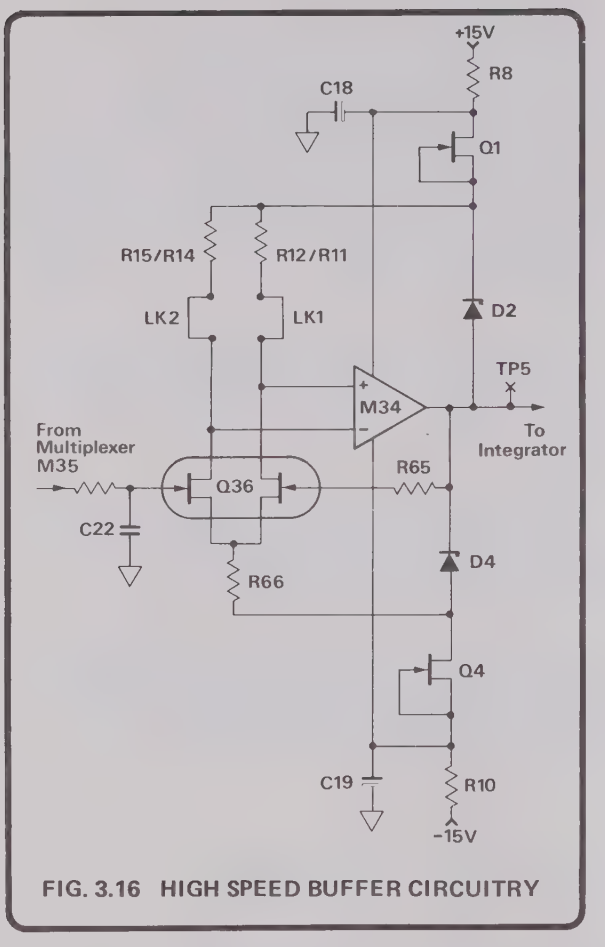


FIG. 3.16 HIGH SPEED BUFFER CIRCUITRY

3.2.3.4 High Speed Buffer

C22 slows the switching edges from the multiplexer M35 so that the buffer cannot slew-limit and thus lose the charge. The signals are fed to Q36, M34 which comprise a high speed buffer with high common mode rejection ratio (See Fig. 3.16). The common mode rejection is dependent on the power supplies of Q36 (from R66 and R11-R15) being bootstrapped to the output of the buffer, via D2 and D4. Thus the difference between input signal and power supply around the input stage is maintained constant whatever the input signal.

3.2.3.5 Integrator

The Integrator basically comprises an amplifier made up from Q35 and M25 with a charge storing capacitor C9 (See Fig. 3.17). The low gate leakage F.E.T. pair, Q35, boosts the gain of the integrator such that it is great enough to guarantee no non-linearity errors due to finite gain.

R4, C10 driven by an attenuated and inverted version of the integrator-output waveform, via R26 and R5, form a circuit to compensate for the small amount of dielectric absorption present in C9.

C11, R23 and R27 provide similar compensation but in this case the time constant is such that it effects the linearity, with R23 set to correct linearity at 1/10th of full range.

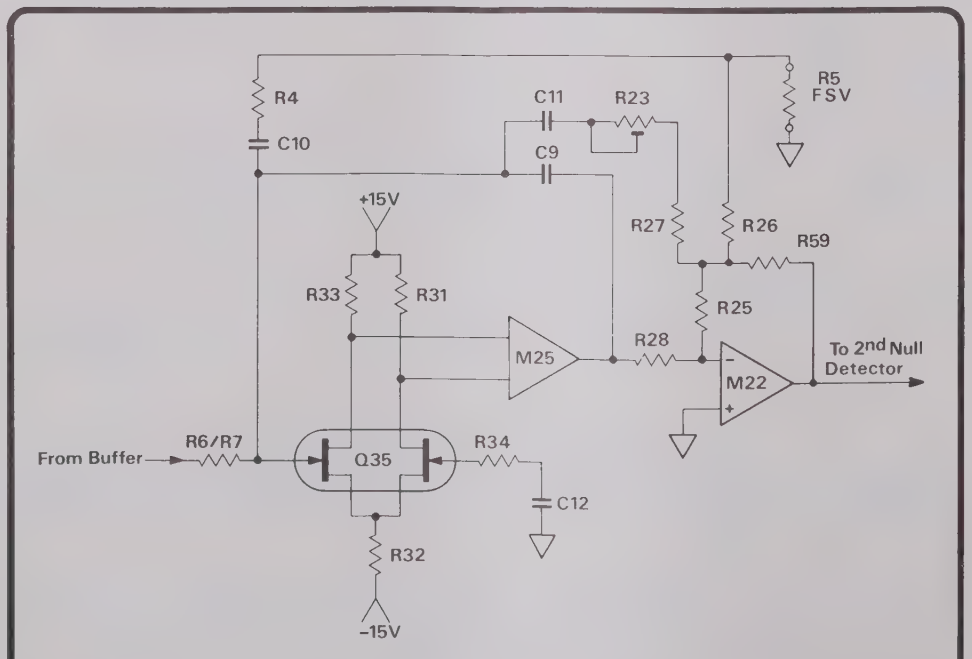


FIG. 3.17 INTEGRATOR CIRCUIT

3.2.3.6 1st Null Detector

The 1st null detector comprises a low noise amplifier, M22, an inverting configuration, where the dc gain is controlled by the ratio of R59 to R28 for small inputs. For larger inputs from the integrator the clamp diodes, D1 and D3, prevent the amplifier from saturating.

During REF 1 the non-inverting input is offset by approximately 10mV to determine the point at which REF 2 is applied (after counting is synchronised). In REF 2 the offset reduces by a factor of 16 giving the null reference point.

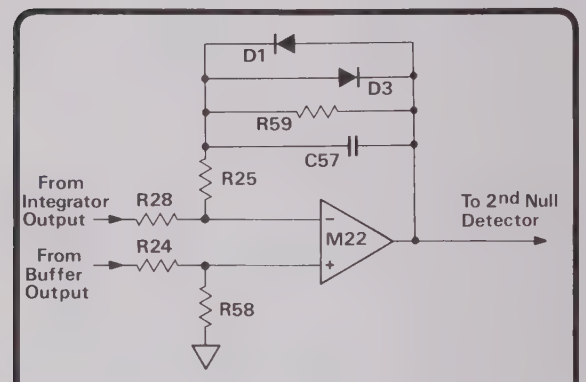


FIG. 3.18 1st NULL DETECTOR CIRCUITRY

3.2.3.7 2nd Null Detector

The signal from the 1st null detector is applied to M15 which boosts the voltage gain. The output provides a logic drive signal via opto-isolator M1, signalling the digital circuitry whenever a null condition changes, Fig. 3.19.

When in an averaging mode (Input Zero or CAL ZERO selected) the 2nd null detector is offset a small amount in a cycle of 16 steps. (See Fig. 3.20). This offset is produced from the digital to analog converter, M28, which is clocked from M6, the C control opto-isolator and enabled by the level shifted $\overline{AVE}$ signal.

3.2.3.8 Reset Period

At the end of a measurement cycle or in hold, the circuitry is placed into a reset condition. The control lines of the multiplexer M35 allows the 0 volts reference input, at pin 4, to be connected to its output. (See Fig. 3.21). At the same time the reset line (M27-3) is taken high turning on M26. This reset signal, applied to pins 5 and 12 of M26, allows the output of the 1st null detector to be fed back via R60 to a sample and hold capacitor C12 on the integrator.

Thus, with the input to the A - D converter at zero volts, the charge stored on C12 is the sum of all the offsets from the multiplexer, buffer, integrator and 1st null detector, allowing the 1st null detector to indicate the true zero crossing (null) point.

The reset signal applied to M26 pins 6 and 13 merely allows a lower impedance path between the buffer and the integrator to speed up the settling time as C9 is discharged to zero.

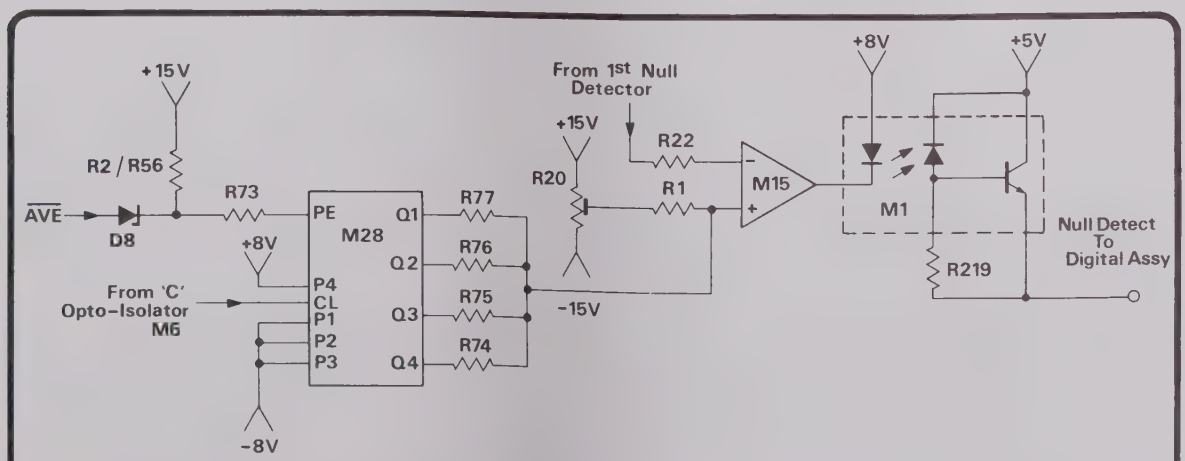


FIG. 3.19 2nd NULL DETECTOR CIRCUITRY

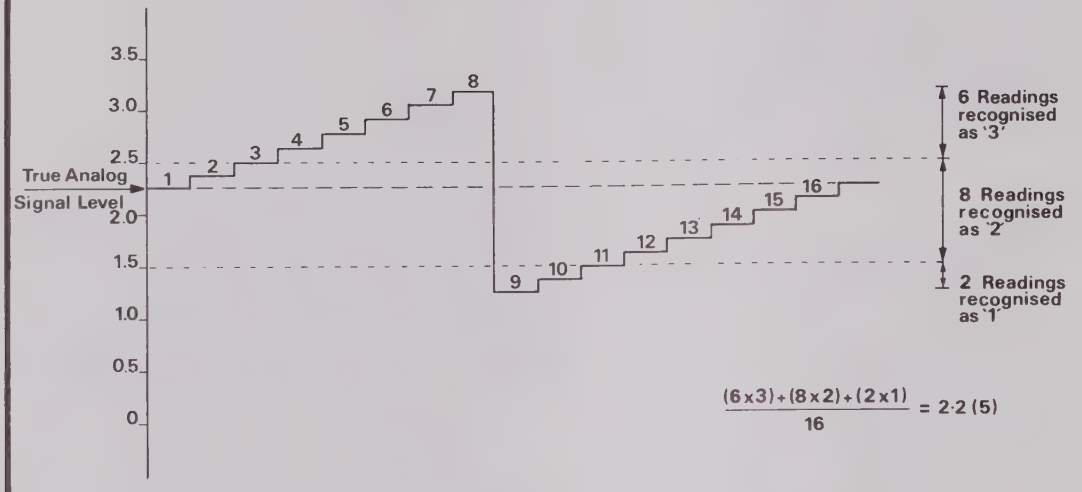


FIG. 3.20 DIAGRAM OF AVERAGING PROCESS

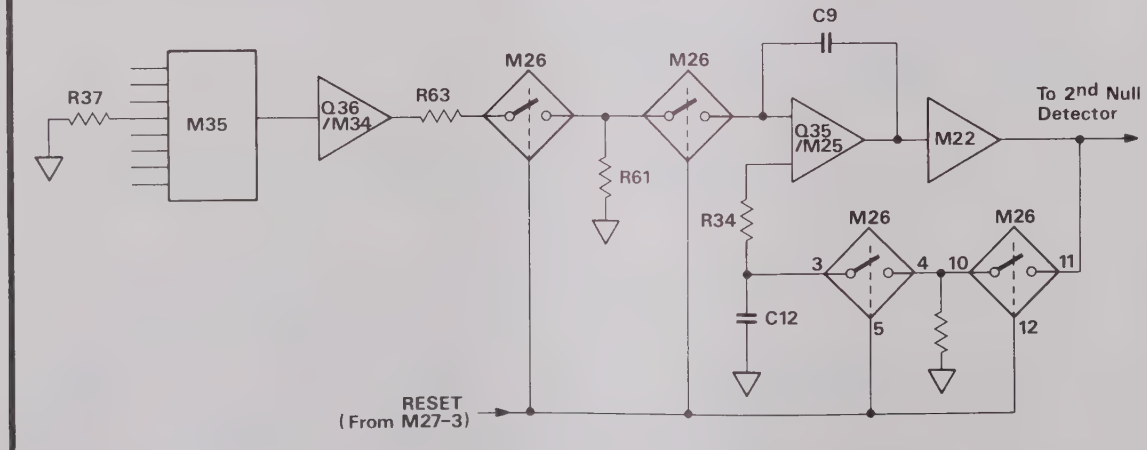


FIG. 3.21 SIMPLIFIED DIAGRAM OF A – D DURING RESET PERIOD

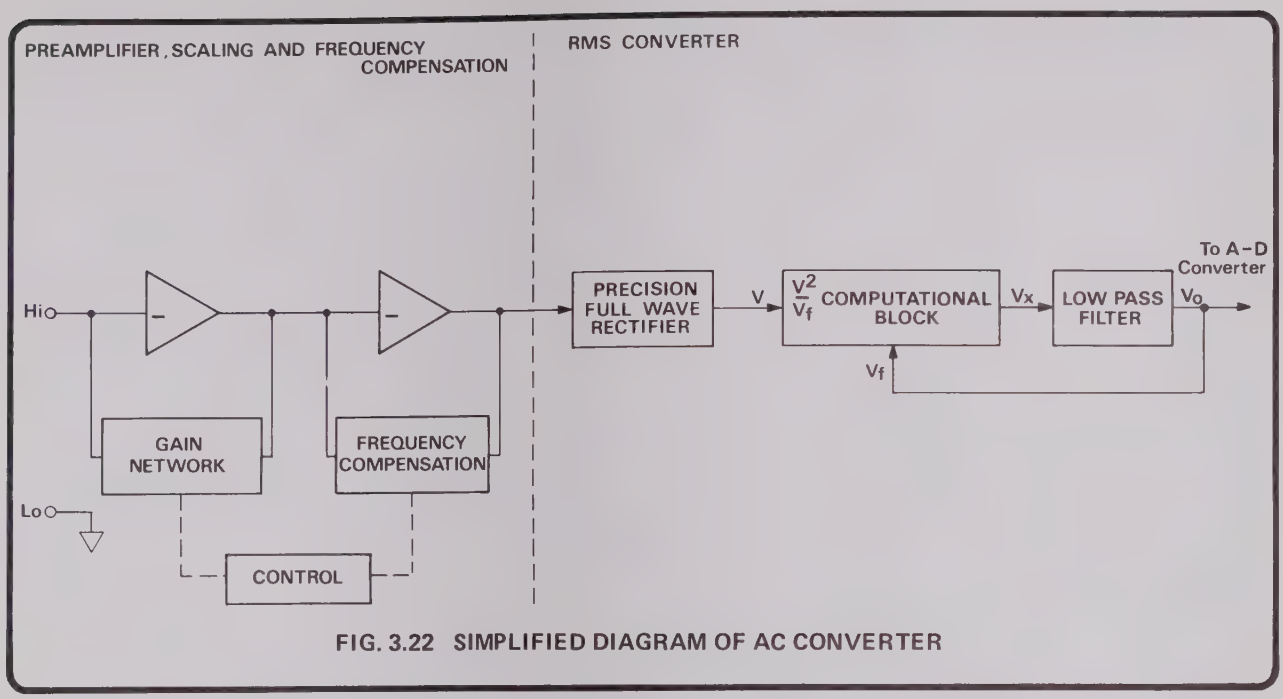


FIG. 3.22 SIMPLIFIED DIAGRAM OF AC CONVERTER

3.3 AC ASSEMBLY (Circuit Drawing No. 430402)

3.3.1 General Principles

The preamplifier buffers and ranges the signal in order to present 0.9 volts full range to the AC to DC converter section.

Once converted to an equivalent DC signal, it is applied to the analog to digital converter on the main analog assembly.

The conversion technique is electronic true RMS sensing as shown in the simplified block diagram Fig. 3.22. The Datron RMS module can be best considered as a functional block consisting of circuitry which accepts two inputs, V and V_f, computes V^2/V_f and has an output of V_x which is then filtered so that all the AC components are removed. The output of the block is fed back to V_f, thus closing the loop around the whole circuitry.

Mathematically: $\overline{V_x} = V_o$

but $V_x = V^2/V_f$

$\overline{V^2}/V_f = V_o$, but $V_o = V_f$

$\overline{V^2} = V_o^2$

i.e. $\underline{V_o = \sqrt{\overline{V^2}}}$

3.3.2 Preamplifier and Scaling (430402 sheet 1)

Relay RL2 is energised on selection of AC, directly connecting the Hi terminal to the input of the AC assembly. If DC and AC are selected together, the AC assembly becomes DC coupled by energising RL3, causing C57, the AC coupling capacitor, to be by-passed.

The signal is then fed to the switched gain inverting preamplifier whose full range output is 0.9 volts r.m.s. A simplified diagram of this arrangement is shown in Fig. 3.23. The frequency response is held flat, to within ±1%, by controlling the gain defining component time constants, to a similar order of accuracy. Residual errors are removed by the frequency compensation stage. (See section 3.3.4).

The preamplifier has a stable DC path provided by a dual transistor pair Q33 and a fast AC path by dual F.E.T.'s Q32 and Q34. Further gain is provided by the following long-tail pair cascade of Q20, Q21, Q22 and Q23, which is loaded by a current mirror, Q24. Q15 and Q16 with bias components Q17 and Q18 form a conventional class AB output stage. R121 compensates for the bias current of Q33, whileR112 trims the offset voltage to zero.

The unity gain frequency compensation amplifier consists of a stable DC path, provide by M11, and a fast AC path provide by Q25 to Q29. The bootstrap circuit of Q19 presents the varicap diode, D11, with a high impedance, thus ensuring that the varicap is not shunted to ground.

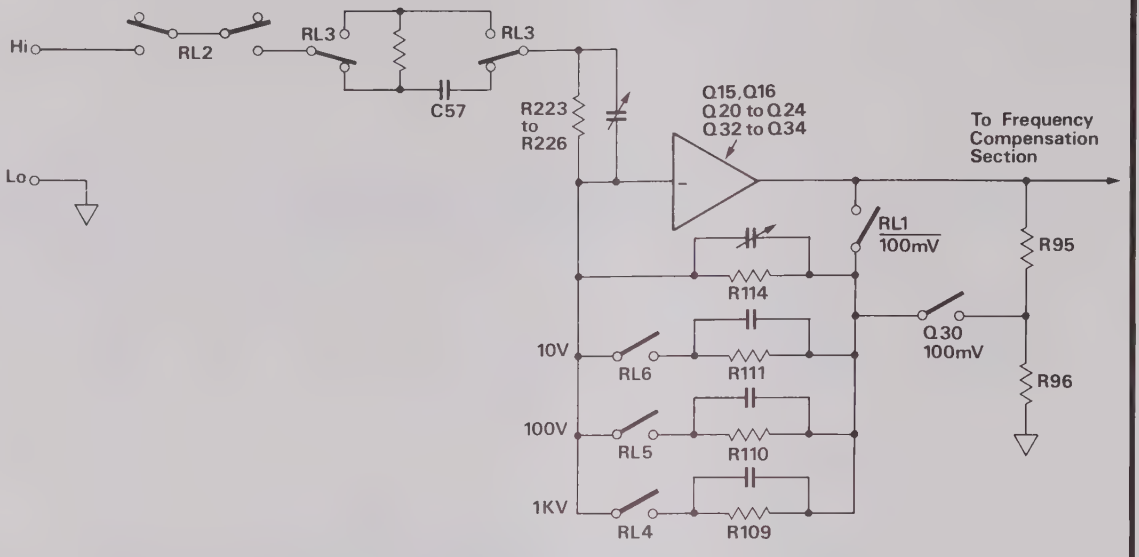


FIG. 3.23 SIMPLIFIED DIAGRAM OF THE AC PREAMPLIFIER SCALING

3.3.3 RMS Converter (430402 sheet 2)

The RMS converter takes the scaled AC signal from the preamplifier and converts it to an equivalent DC signal suitable for Analog-to-Digital conversion. The conversion technique is electronic true RMS sensing as shown in the simplified block diagram Fig. 3.25.

M8 and M9 form a summing type, full wave rectifier. The output of M8, a precision half-wave rectifier inverter, is summed with the non-inverted signal with a weighting of 2 : 1 at the input of M9. This forces a full-wave rectified current to flow in RMS module M6. Potentiometer R50 balances the rectifier to provide the same output for non-inverted or inverted asymmetric waveforms.

The output current from the RMS module passes into filter-buffer M1 and is converted to a nominal 5 volt for a full range signal. Q1 and Q2 switch in additional capacitors when FILTER is selected, to operate down to 45Hz. M2 is a voltage to current converter providing a feedback current to the RMS module proportional to the output voltage. R90 is the zero adjustment for the half wave rectifier M8 and R35 is the high crest factor gain adjustment. R75 is adjusted for optimum linearity.

The output of M1 (TP2) is fed to a resistor chain R1 - R7, to provide an output of 3.14 volts by the selection of resistors R2 - R5. Q3 is turned on when AC is selected and switches the output of the AC converter into the Analog-to-Digital Converter (Drawing No. 430328 sheets 3 and 4).

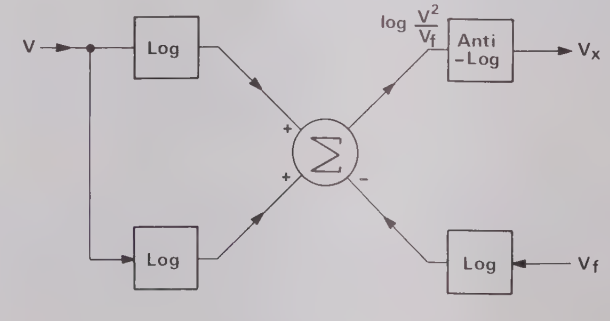


FIG. 3.25 BLOCK DIAGRAM OF RMS CONVERSION TECHNIQUE

3.3.4 High Frequency Compensation

During the calibration cycle, the microprocessor notes and stores the high frequency (HF) error of each range. When AC volts is selected the compensation information for a particular range is recalled by the microprocessor, transferred across the isolation barrier and latched on to M13, M14 (Drawing No. 430328 sheet 5), see Fig. 3.26. As in the case of the Input Current Compensation (section 3.2.2.5), the output from the latches is applied to a digital-to-analog converter, AN2. The voltage produced is fed to the AC converter via connector J1 pin 11 and applied to varicap D11. The varicap is thus adjusted to give the amplifier chain a flat frequency response.

The calibration is carried out at one H.F. frequency but since it flattens the AC amplifier response, the correction is valid for all specified frequencies. It should be noted that the calibration routine is iterative since the varicap is non-linear.

3.3.5 Frequency Detection (430402 sheet 2)

The signal frequency is monitored by M10 which is set so that a signal frequency greater than 5kHz causes a logic '1', (0 volts) on M10 - 4. This signal indicates to the Digital Board via M18, M2 (Drawing No. 430328 sheet 5) which one of the two sets of specifications should be used for calculating the measurement uncertainty when the ERROR key is depressed.

3.3.6 Test

During the self-test routine (actuated from the front panel or remotely programmed) the AC assembly is checked for correct operation. The circuitry is placed into the .1V range as described in Section 3.2.1.3. Filter is selected and F.E.T. Q31 is 'closed' from M5 - 13 causing a signal of 0.08 volts DC to be injected into the preamplifier. Thus a signal of approximately 3.14 volts is output from the RMS section and applied to the A - D converter situated on the Analog assembly. This signal is then measured and compared with a stored value. If the measured signal is within ±6% of the stored value, the test continues with a 1V range check.

Range	Output from RMS section
.1	+3.14 volts
1	+0.314 volts

3.4 OHMS ASSEMBLY (Circuit Drawing No. 430331)

The instrument functions by measuring the voltage across an unknown resistance with a known constant current flowing in it. The converter can be split into two parts: a low drift voltage follower and a constant current source covering 6 decades from 100nA to 10mA (see Fig. 3.27).

It should be noted that when the Ohms assembly is fitted the DC Isolator Lo is no longer directly connnected to the front/rear panel Lo terminal, but goes via RL1 on the Ohms assembly (connector link removed on side panel). Lo becomes an active terminal in resistance measurements.

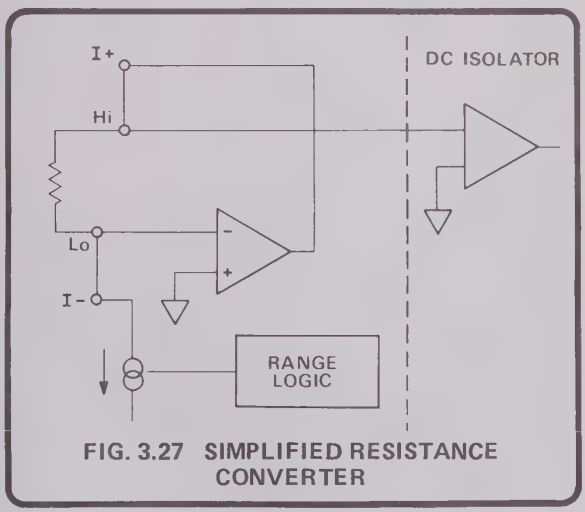


FIG. 3.27 SIMPLIFIED RESISTANCE CONVERTER

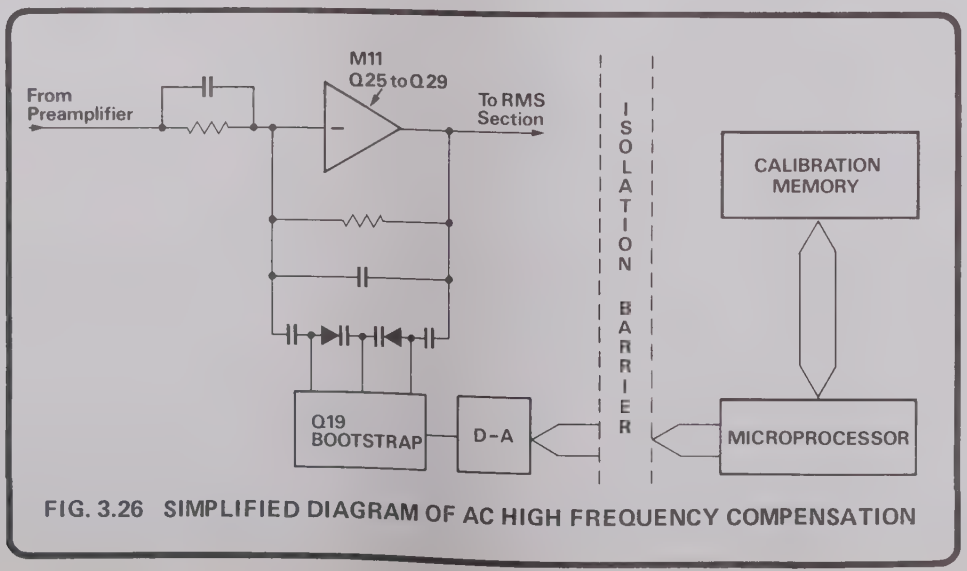


FIG. 3.26 SIMPLIFIED DIAGRAM OF AC HIGH FREQUENCY COMPENSATION

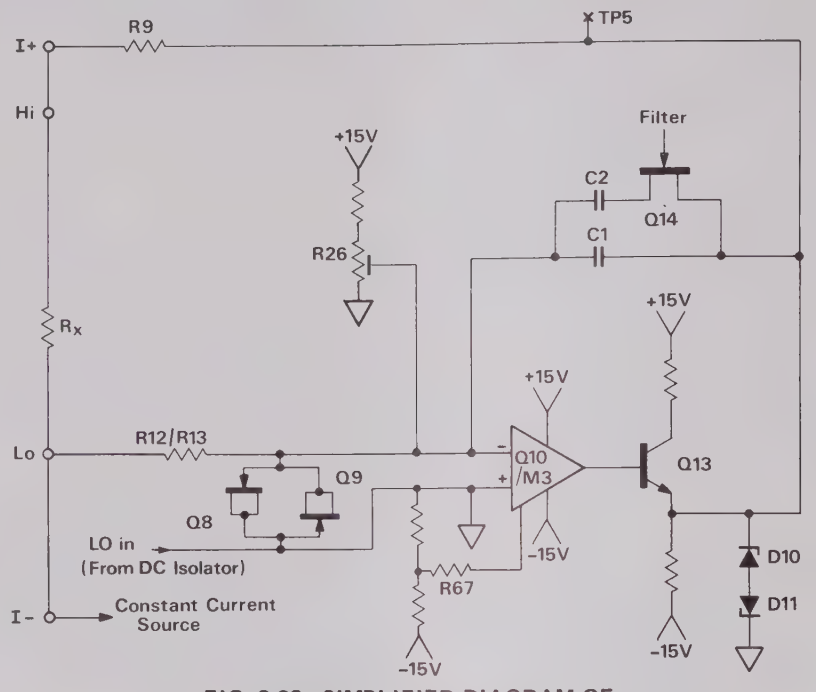


FIG. 3.28 SIMPLIFIED DIAGRAM OF VOLTAGE FOLLOWER CIRCUIT

3.4.1 Low Drift Voltage Follower

When OHMS is selected, the front panel Lo terminal is connected to the –ve input of amplifier Q10/M3, the +ve input being referred to DC isolator Lo (this remains reference common). Q10/M3 together with output follower Q13, will thus apply a voltage at the I+ terminal via RL1 such that the voltage at front panel Lo is at reference common plus any offset due to Q10/M3. This voltage offset drift is kept small for changes of temperature by compensating the input bias current of Q10 with the current in R67, which changes with temperature due to the voltage drift at Q10 emitters. Q10 input bias current is initially nulled by R26.

Thus if we consider 2-wire measurement, I+ is linked to Hi, I– is linked to Lo and the unknown resistance linked between Hi and Lo, with a constant current flowing from I+/Hi, through the unknown resistance (R_X) to Lo/I–. The Lo terminal is maintained at 0V. Therefore the Hi terminal (DC Isolator Input) is at $I_{constant} \times R_X$ volts above Lo. As long as the error is small referred to reference 0, the DVM will read the correct resistance.

Input protection is provided as follows:–

Voltage/Current applied to input terminals:

I+	R9, D10, D11
I–	R2, D1, D2, Q25, R23
Lo	R12, R13, Q8, Q9

Open circuit voltage limit protection:

I+	R15, R16, Q6, Q7
I–	R6, D7, D8, Q2, Q22

3.4.2 Constant Current Source

Seven decades of ohms ranges are provided by 6 ranges of current and 2 ranges of DC Isolator voltage gain (100mV range for 10Ω, 1V range otherwise). See Fig. 3.29.

Range	Current	F.E.T.'s/Switches turned on	
		Current Selector	Leakage path
10Ω	10mA	Q11, M2(A)	
100Ω	10mA	Q11, M2(A)	
1kΩ	1mA	M1(A)	
10kΩ	100μA	M1(B)	
100kΩ	10μA	Q4	M2(B)
1MΩ	1μA	Q1, M1(D)	Q3, M2(C)
10MΩ	100nA	Q1, M1(C)	Q3, M2(C)

FIG. 3.29 OHMS CURRENT RANGE SWITCHING

When kΩ's is selected, Q17 (sheet 2) is turned on enabling astable M6 to produce a 200Hz signal to switch M5. Thus when gates B and C of M5 are open, C9 is charged up from the negative reference (originating from the analog section of the A - D converter). These gates then close and A and B open, sharing the charge with C8, the voltage across C8 equals the reference voltage (sheet 1).

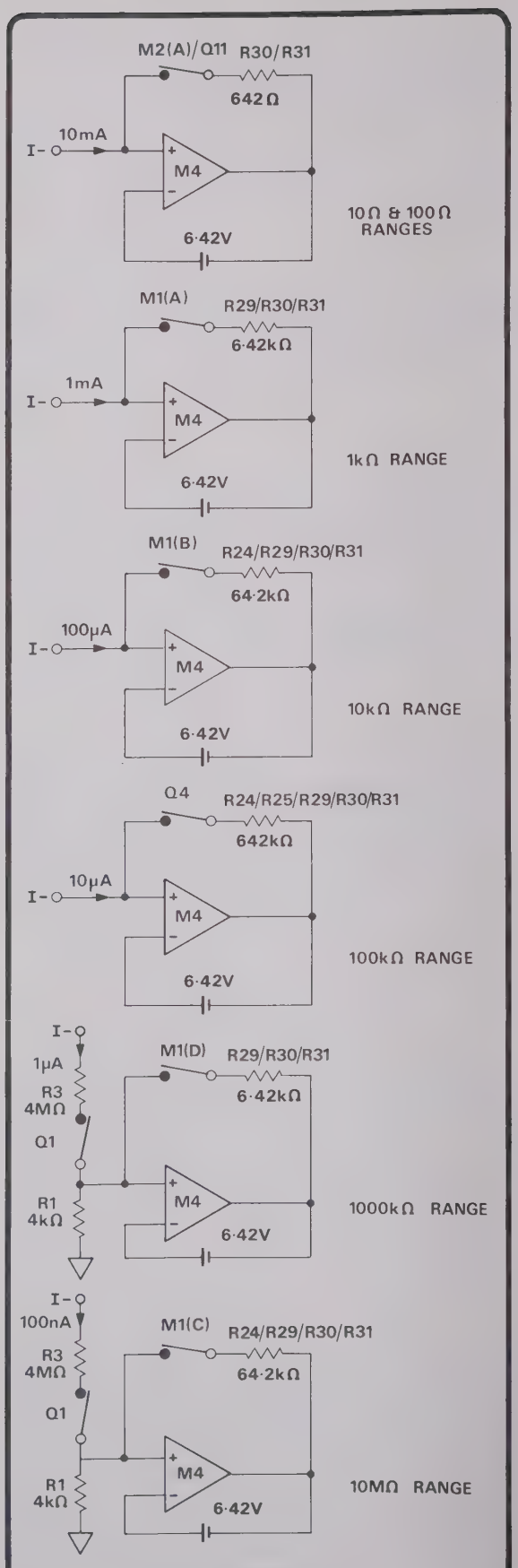


FIG. 3.30 SIMPLIFIED Ω CURRENT SWITCHING

The voltage developed across C8 causes M4 to sink current through resistor chain R24, R25, R29, R30, R31 until the voltage developed across the chain balances that across C8. Thus the current required for a particular range is selected by the value of the resistor chain switched byM1, M2 and Q4. Simplified diagram Fig. 3.30 shows the resistor chain and switching for each range. On the high resistance ranges leakage paths are provided by Q3, M2(B) and M2(C).

To produce good common mode rejection, M4 supplies are bootstrapped, the supply span being defined by a 12 volt zener, D17. The filtered bootstrap supplies (+ΩBS and −ΩBS) power the astable (M6) and bilateral switch.

The use of ohms guard permits in-circuit measurement of resistors, provided shunt paths are greater than 250Ω and a suitable tapping point is available. Consider Fig. 3.31. Guard is reference 0, Lo is actively maintained within microvolts of reference 0 (as previously explained). Thus there is no voltage across Rz and consequently no current in Rz. Voltage follower Q10/M3 will simply pass more current into Ry from the I+ terminal until the selected current for the particular range flows through Rx.

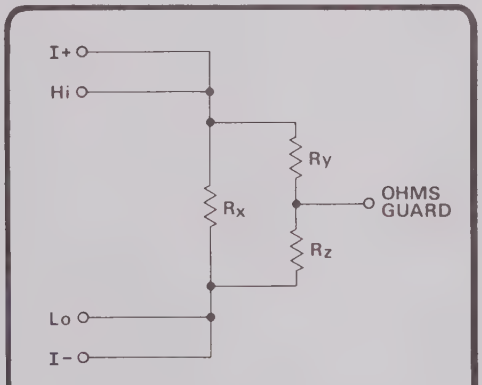


FIG. 3.31 USE OF OHMS GUARD

3.4.3 Test

During the self-test routine (actuated from the front panel or remotely programmed), the Ohms Converter is checked for correct operation. The circuitry is placed into the 10kΩ range as described in Section 3.2.1.3. Filter is selected and F.E.T. Q5 'closed' from M9-1 causing R8 (9.76kΩ) to be placed between I+ and I−. Thus with I+ and Hi, I− and Lo connected (2-wire if front panel input selected), the DC Isolator (which is also in the TEST mode) measures the voltage developed across the resistor (approx 1 volt). The resulting voltage output from the DC Isolator is applied to the A-D converter, measured and compared to the stored value. If the measured signal is within ± 6% of the stored value, the test is complete.

3.5 CURRENT ASSEMBLY (Drawing No. 430304)

The Current assembly contains a set of selectable precision current shunts, the voltage developed across the shunt(s) being sampled by the DC or AC voltage measurement circuits.

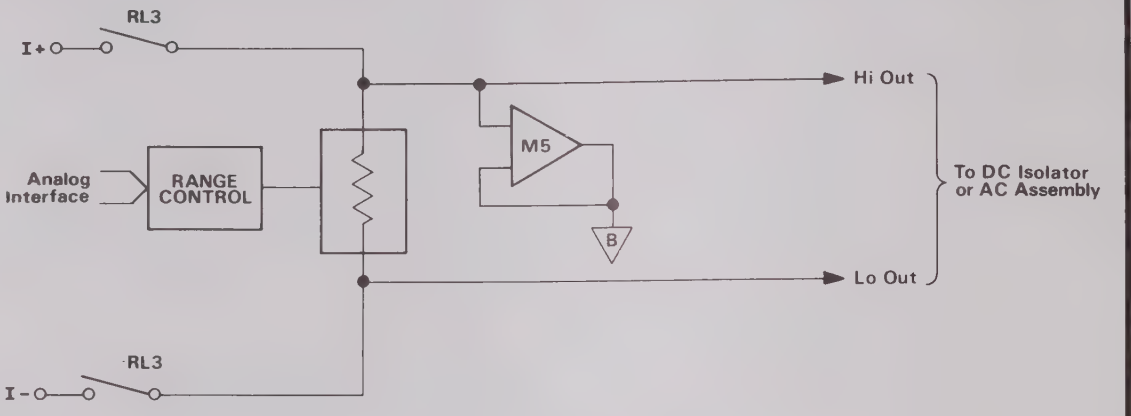


FIG. 3.32 SIMPLIFIED DIAGRAM OF CURRENT ASSEMBLY

3.5.1 Current Measurements

Precision current shunts of 0.1Ω, 1Ω, 9Ω, 90Ω and 900Ω connected in series provide an output of 100mV for a full range signal. To eliminate errors in measurement due to lead or contact resistance, all current shunts are 4-wire sensed i.e. a pair of current leads and a pair of voltage leads to the shunt(s) switched separately. The voltage developed across the shunt(s) is fed to the DC Isolator in DCI and the AC assembly in ACI or DCI + ACI. The latter, DC coupled mode, computing the RMS value of the DC and AC component of the input current. These circuits are placed in the '.1V range' amplifying the signal by 3.16. The output of buffer M5 is used to guard leakage paths on the current board.

Overload protection up to 2 amps is provided by diodes D13 – D16. An input greater than 2 amps causes the current fuse, located on the rear panel, to blow.

3.5.2 Test

During the self test routine, the Current assembly is checked for correct operation. The circuitry is placed into the .1mA DC current range as described in Section 3.2.1.3 with the DC Isolator in the 100mV range. Filter is selected and F.E.T. Q9 closed from M4 – 10 allowing current to flow through R18 to the 100μA range shunts, from the +15V supply. Thus a voltage of approximately 0.3 volts is developed across the shunts and fed to the DC Isolator. This voltage combined with the effect of the voltage injected due to the DC Isolator being in Test (Section 3.2.2.6) causes the output of the DC Isolator to be approximately 5.75 volts. After measurement by the A-D converter, the value is compared to the stored value. If the measured signal is within 6% of the stored value, the test is complete.

3.6 REAR INPUT/RATIO INPUT (Circuit Drawing No. 430307).

3.6.1 General

The Rear Input/Ratio Input assembly contains the switching circuitry to enable one of the three analog signal sources to be connected to the measurement circuits of the DVM. When Rear Input is selected either remotely or on the rear panel of the instrument and the RATIO key is depressed, the switching circuitry, under microprocessor control, selects the ratio (reference) input then the rear (signal) input, taking one valid reading at each stage.

3.6.2 Front Panel/Rear Panel Input

When Front Input is selected, either remotely or on the rear panel, this causes the base of Q1 to be connected to 0 volts, turning on the transistor. Thus relays RL1 and RL2 are energised, causing the front signal input terminals to be connected to the measurement circuits. Should Rear Input be selected, relays RL1 and RL2 are de-energised, connecting the rear input to the measurement circuits.

3.6.3 Ratio

During the last part of the analog interface update sequence (see Fig. 3.6) M1-5 is taken high causing the flip-flop (M1) to be clocked high (0 volts) on pin 1. The signal is applied to Q2 energising the ratio mode input selector relays, RL3 and RL4. Thus the inputs to the 'Ratio Input' on the rear panel are connected to the measurement circuits. Once a valid reading has taken place, the 'Rear Input' lines are connected to the measurement circuits by leaving M1-5 low. This de-energises the relays as Q2 is turned off. Another reading is then taken and the ratio calculated.

3.6.4 Test

When TEST is selected, the ratio option is checked to see if it is fitted, by interrogating the AD4 line to see if it is held high.

3.7 ANALOG OUTPUT (Circuit Drawing No. 430308)

3.7.1 General

The Analog Output Board accepts the DC Isolator or AC Converter Output and converts it to a ±1 volt DC full range output. This signal can then be used, for example, to drive X-Y plotters or strip chart recorders.

3.7.2 Description

The 3.16V full range signal from the DC Isolator or AC Converter is buffered by unity gain amplifier M2. The output is potentially divided by R7 and R8 so that 1 volt full range is presented to M1, another unity gain amplifier. Potentiometer R5 is adjusted to remove any offset caused by M1 and M2. Positive temperature coefficient thermistors R3, R4 and diodes D1, D2, protect the Analog Output circuitry from accidental input applied to the Analog Output external connector.

3.8 DIGITAL ASSEMBLY (Circuit Drawing No. 430329)

The Digital assembly contains the circuitry providing the general management of the instrument and the digital section of the A-D converter. Fig. 3.33 outlines the main portions and signal highways of this board.

3.8.1 Processor and Memory (430329 sheet 1)

A 6800 microprocessor (MPU) together with 8k bytes of memory controls the communication between the front panel, digital interface, display drivers, Digital and analog assemblies. The memory can be split into five main areas:—

(1) Program Memory - needed to operate the whole instrument system.

(2) Constant Data Memory - e.g. Self Test limits, Error read-out specifications and other fixed factors.

(3) Non-volatile Calibration Memory - used to store all the calibration errors used for each reading and determined during the 'Auto-cal' cycle.

(4) Operating Memory - used for scratch pad operations and storing.

(5) Volatile Display Memory - volatile data such as Max-Min stores, Limit stores and computation stores.

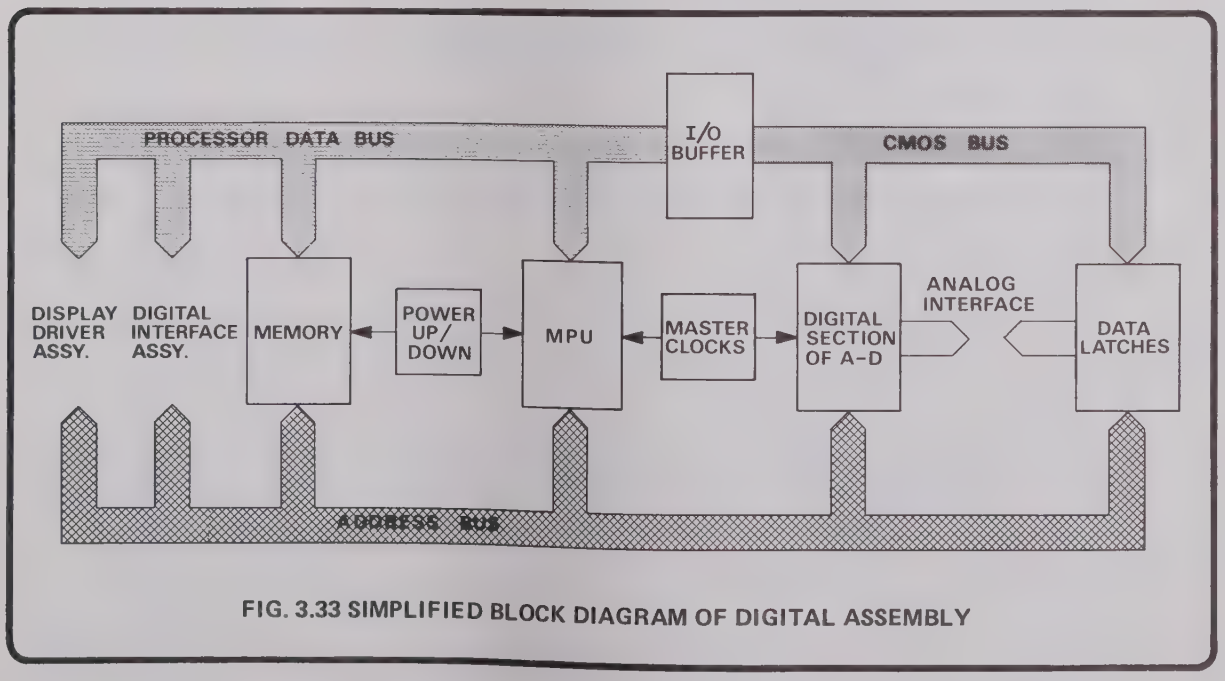


FIG. 3.33 SIMPLIFIED BLOCK DIAGRAM OF DIGITAL ASSEMBLY

3.8.1.1 Software Overview

The system uses the technique of a looping prioritised job scheduler (see Fig. 3.34). Each job driven from the scheduler is controlled by a flag in the system workspace which is set when the job is required to be run and cleared when completed. Priority of activation is ensured by making each job exit on completion, to the top of the schedule.

Program Modules: The program memory is split into a series of functional modules, each module corresponding fairly closely to a major functional area and hence to one of the jobs activated by the job scheduler, the larger ones being sub-divided, see Drawing No. 890011.

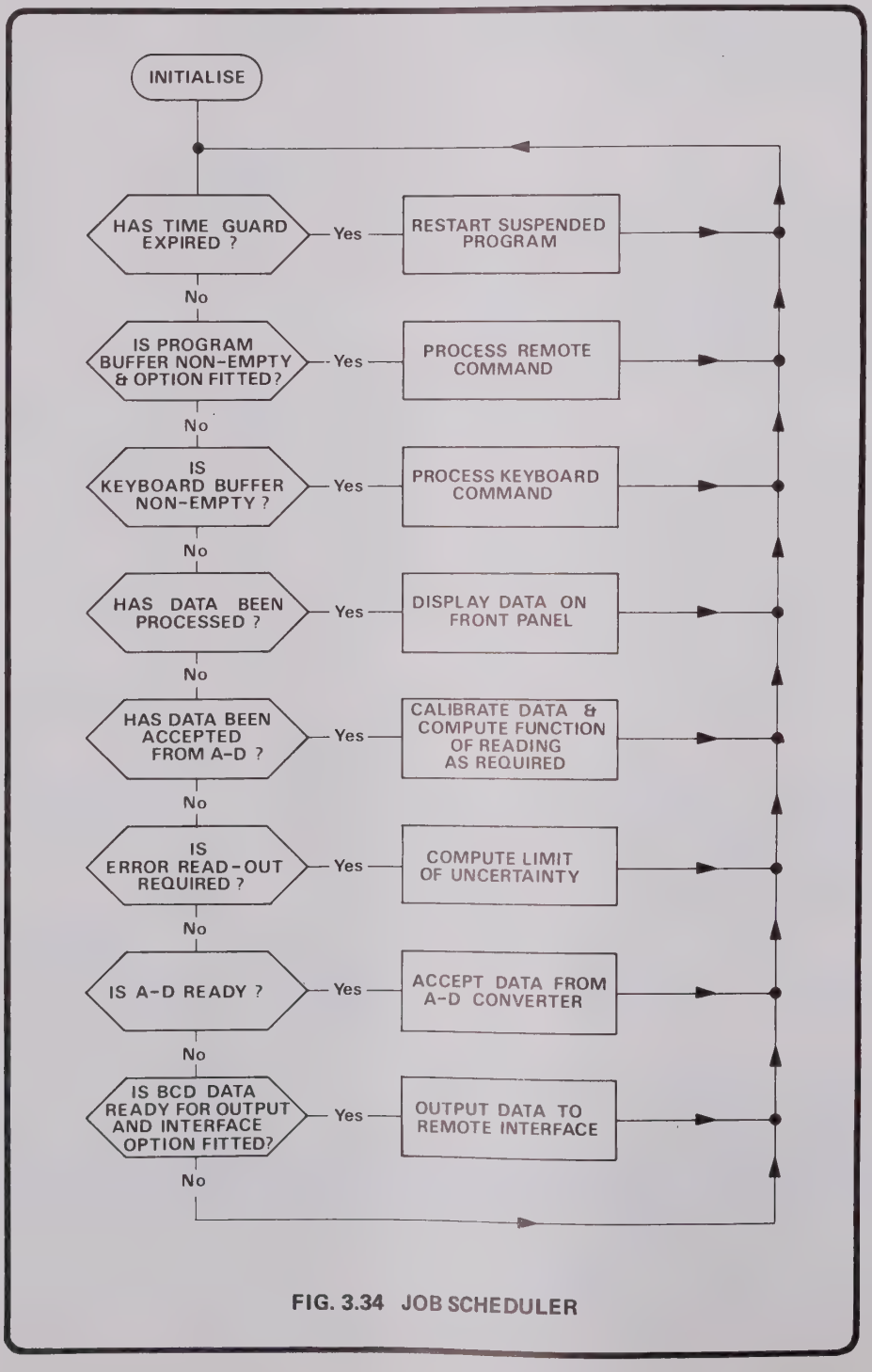


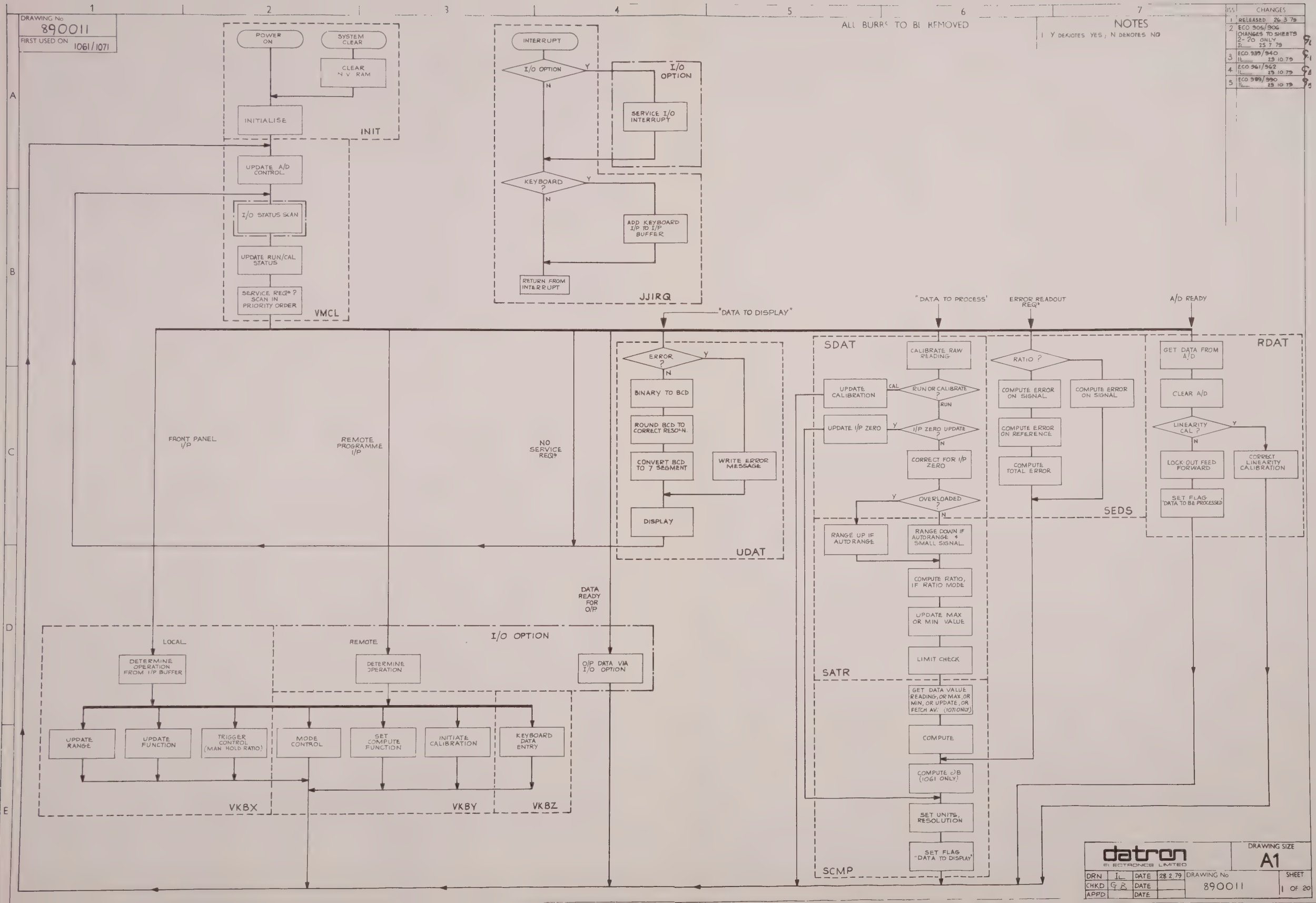
FIG. 3.34 JOB SCHEDULER

DRAWING No 890011
FIRST USED ON 1061/1071

ALL BURRS TO BE REMOVED

NOTES
1 Y DENOTES YES ; N DENOTES NO

ISS	CHANGES
1	RELEASED 26 3 79
2	ECO 905/906 CHANGES TO SHEETS 2-20 ONLY IL 25 7 79
3	ECO 939/940 IL 23 10 79
4	ECO 961/962 IL 23 10 79
5	ECO 989/990 IL 23 10 79



datron ELECTRONICS LIMITED

DRAWING SIZE A1

DRN	IL	DATE	28 2 79	DRAWING No 890011	SHEET 1 OF 20
CHKD	GB	DATE			
APPD		DATE			

Data Control: Data handled by the system consists of a stream of measurement information on which a number of operations are carried out and a second stream, asynchronous with the first, consists of commands derived from the front panel or digital interface controlling both the measurement circuits and computation programs. Operations on the measurement stream basically consist of acquiring the raw data from the A-D converter, calibrating this data and carrying out any other computations, and converting and formatting the data for output. Note that a job consuming data is given higher priority than the one producing data for it, allowing a producer to place data into an empty buffer. The consumer is activated by a flag, set by the producer to indicate data ready in the buffer.

Process Control: Control of the instrument by the processor, initiated from the front panel or digital interface, is arranged by using a 'pipeline control' of the major system state and a 'first in/first out' buffer between the interrupt level routine receiving the control command and the main program implementing it. The major system state consists of the range, function, resolution, filter, ratio, autorange, etc., flags and the computation mode (reading, A-B, ÷C, etc.). The pipeline comprises three levels. The top, level 1, reflects the state being programmed, the second, level 2, the state of the measurement circuits and the third, level 3, the measurement being processed. When a command is input, level 1 is updated (e.g. a new range is selected) and as soon as the measuring circuits are not converting an input signal, the state in level 1 is moved to level 2 causing the measurement circuits to update to the new state. When an A-D conversion is complete, data is read from the A-D and the state transferred from level 2 to 3, providing information for the processing routines. Additionally, at this time, the level 1 to level 2 transfer is repeated and the measurement circuits again updated to allow for commands received while the conversion is in progress.

A second control mechanism used is to input all the commands via a 'first in/first out' buffer between the interrupt level routine receiving the command and the main program implementing it. Thus the processor under remote control is able to 'simultaneously' set up the requirements for the next reading, convert the current reading and process the last one.

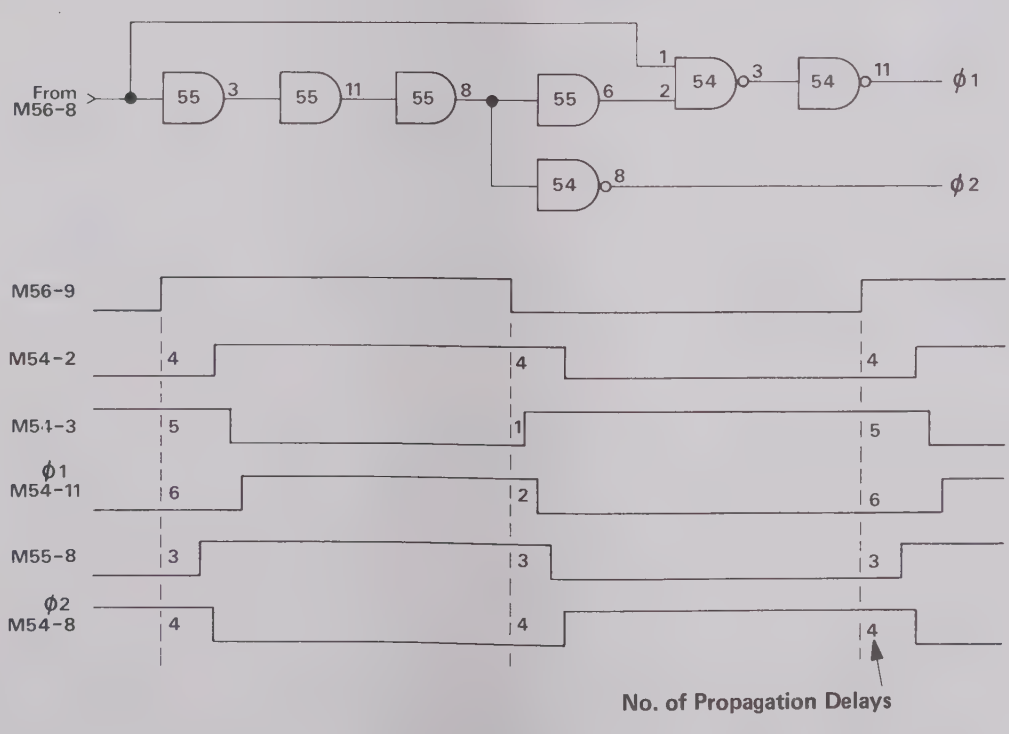


FIG. 3.35 TWO-PHASE CLOCK GENERATION

3.8.1.2 The Two-Phase Clock

The 6800 requires a non-overlapping positive two-phase (Ø1, Ø2) clock and is derived from the line locked master clock (sheet 4) producing a 1.6MHz (50Hz supply) or 1.9MHz (60Hz supply) signal. M57 acts as a ÷2 thus antiphase 800kHz square-waves appear on pins 14 and 15. If data is not being transferred to the CMOS Bus, M57-11 is high, thus M56-8 follows M57-15. The non-overlapping of Ø1 and Ø2 is produced by the utilisation of the inherent propagation delay (approx. 10nS) through each gate of M54 and M55. This is best seen by referring to Fig. 3.35 the circuitry around the output stage increasing the voltage levels demanded by the processor (0V and +5V).

During a period when data is being transferred across the CMOS Data Bus, Ø1 and Ø2 are reduced to 400kHz by utilising the other half of M57. The signal CMOS I/O is high thus a 400kHz square-wave is output on M57-11, the waveforms of Ø1 and Ø2 are altered such that one half of the period is stretched, covering 1½ cycles of the normal 800kHz operation. (See Fig. 3.36).

3.8.1.3 RAM/ROM Circuit

The 6800 uses two ROM's which contain the programs necessary to run the instrument. Each ROM is able to store up to 4096, 8 bit 'words' of program information which are grouped in program modules. Both ROM's receive the address information output by the processor on to the Processor Address Bus. The particular ROM to be addressed being selected by decoding three of the address lines and applying the resultant to the 'chip select' line (via M34 pins 6 or 8) (See Fig. 3.37).

The information held in that particular location is sent back to the processor via the Processor Data Bus.

The processor also uses 512 bytes of 8-bit wide RAM made up from four 256 x 4 bit RAM'S. Half of this memory (M19/20) is backed up with a battery to provide the non-volatile calibration and 'input zero' store and can only be overwritten when CAL or INPUT ZERO is selected. The remaining 256 bytes (M36/37) are used as operating memory for scratch pad operations and storing volatile data (e.g. Max, Min). A particular location is set by the 6800 on the Processor Address Bus using A_0 to A_7, the pair of RAM'S being selected by decoding some of the other Processor Address lines with VMA.Ø2. Control of the read/write lines is performed by the MPU, the signal being gated with a 'Master Clock ÷ 2' signal to provide correct timing.

An instrument power up is detected by M60/M62 causing an initialisation $\overline{\text{RESET}}$ signal to be fed to the MPU via Q16. (See Fig. 3.38).

During a power-up or power-down (+5V supply line $<$ +4.75 V) a signal from the supply-level detectors prevents RAMS M19 and M20 from being overwritten by holding the CS (chip select) lines low ($<$0.2 volts) via Q14 for a period of approx. 25mS determined by R55/C32.

3.8.2 CMOS Address Decode and Input/Output Circuits (430329 sheet 2)

Information is transferred to and from CMOS devices via the CMOS Data Bus during periods when the signal CMOS I/O is high (M33-6). This takes place when the Processor Address Bus bits A11, A14 and A15 are high. The transfer of data between the Processor Data Bus and the CMOS Data Bus takes place at 400kHz, the Read/Write lines selecting the direction of information through the tri-state buffers M4, M5 and M6.

In order to uniquely address the various CMOS input/output devices, the address lines must be further decoded. M16 and M32 are dual 2 to 4-line decoders using the states of CMOS I/O and address lines A0, A1, A4, A5 to enable or partially enable the input/output devices, except the output of M16 pins 2 and 15 which are inverted and gated with data line A2 to produce the required decode.

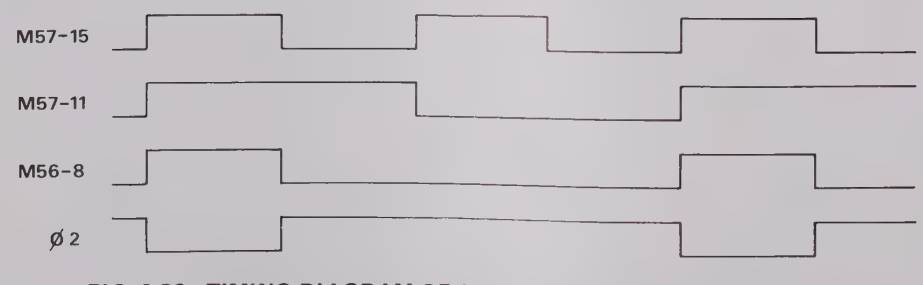


FIG. 3.36 TIMING DIAGRAM OF STRETCHED TWO-PHASE CLOCK

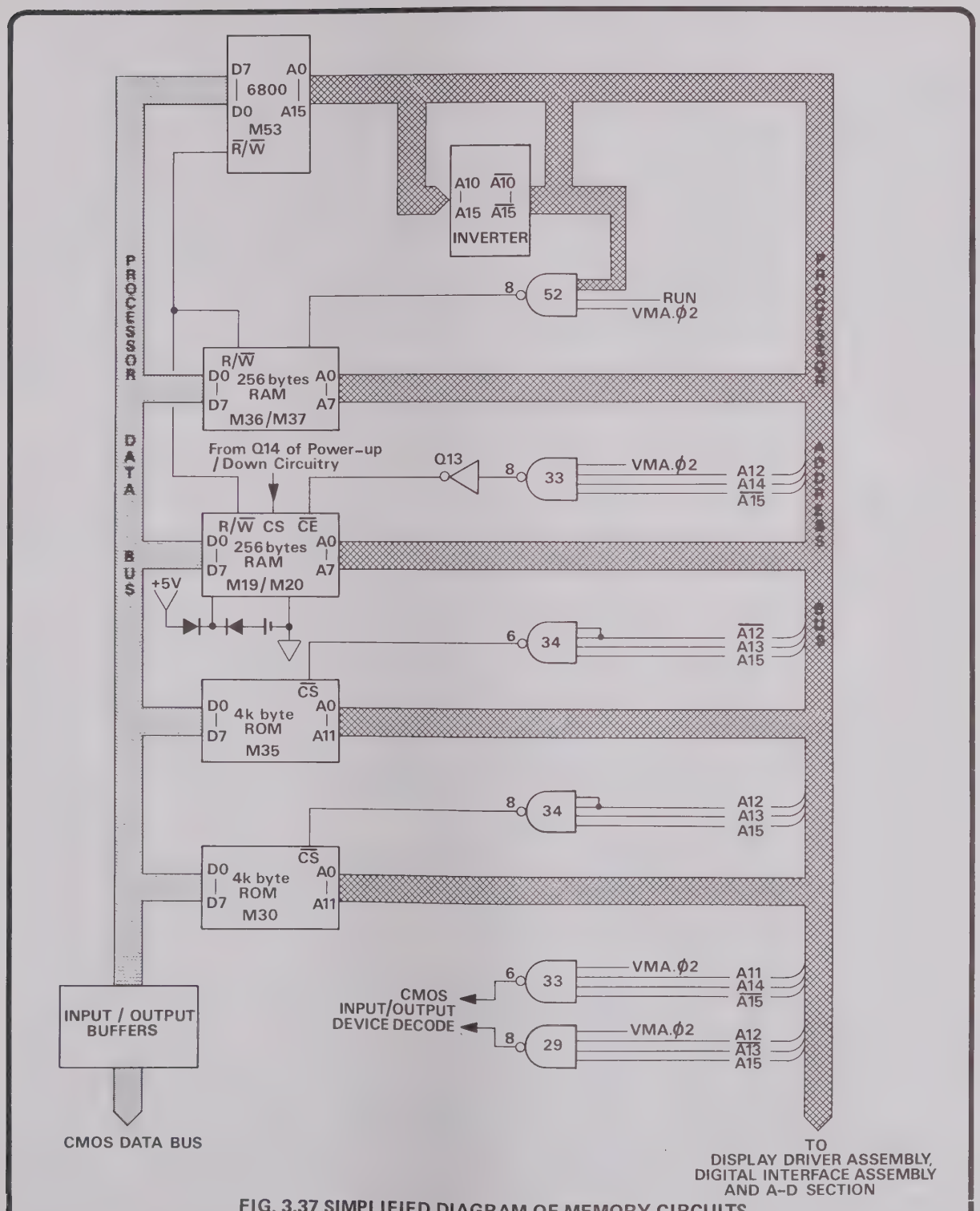


FIG. 3.37 SIMPLIFIED DIAGRAM OF MEMORY CIRCUITS

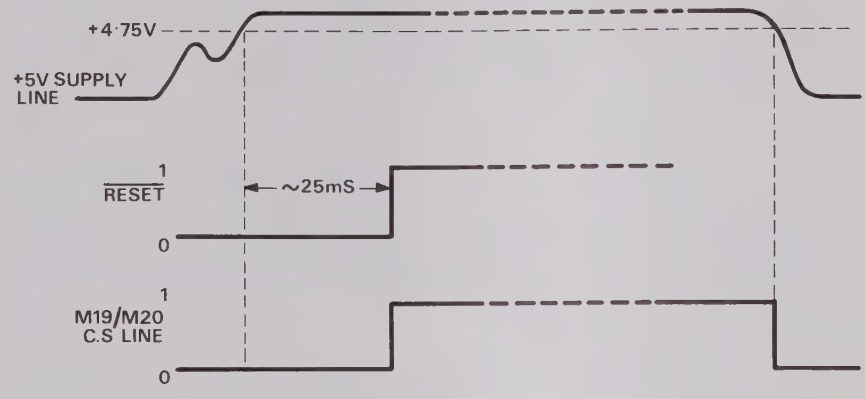


FIG. 3.38 START UP AND NON-VOLATILE RAM PROTECTION

A5	A4	A2	A1	A0	SIGNAL	M32/M16 Pin No.	Operation
0	0	1	X	X	$\overline{\text{XKYBRD}}$	M32-7	Keyboard read/write
0	1	X	X	X		(M32-6)	Forces a MPU 'power up' sequence
1	0	1	X	X	$\overline{\text{XADDT}}$	M32-5	A-D main counter output enable
1	1	X	X	X		(M32-4)	Analog interface address latch input enable
0	0	X	0	0	$\overline{\text{XKDSP0}}$	M16-7	partially enables input to keyboard l.e.d. latches
0	0	X	0	1	$\overline{\text{XKDSP1}}$	M16-6	
0	0	X	1	0	$\overline{\text{XKDSP2}}$	M16-5	
0	0	X	1	1	$\overline{\text{XKDSP3}}$	M16-4	
1	0	X	0	0	$\overline{\text{XADSTA}}$	M16-9	A-D, and interupt status output enable
1	0	X	0	1		M16-10	Error switch output enable
1	0	X	1	0	$\overline{\text{XADCTL}}$	M16-11	A-D control latches, input enable
1	0	X	1	1	$\overline{\text{XADDLY}}$	M16-12	A-D delay counter input enable

FIG. 3.39 CMOS ADDRESS DECODING

3.8.3 Analog to Digital Conversion (Digital Section)

3.8.3.1 General Principle

Block diagram Fig. 3.40 outlines the essentials of the digital section and should be used with flowchart Fig. 3.41 in order to follow the operation of this section.

The function of this section of the circuitry is to generate the sequence that when transferred to the analog section, controls the sequence from RESET through the integration cycle and back to RESET. The circuitry controls the length of SIG and BIAS and counts during REF 1 and REF 2, the accumulated count being proportional to the length of the reference periods, which in turn is proportional to the measured input signal. At the end of each reading cycle the count is read by the MPU, processed and displayed.

3.8.3.2 Preset Procedure

As part of the initialisation routine (at switch on), M47 (used as the sequence controller), is reset from M37-11, causing M47-2 to be logic '1'. Thus the control lines $\overline{A}$, $\overline{B}$ and $\overline{C}$ put the analog section of the A-D into $\overline{\text{RESET}}$ (See Fig. 3.42). The Address Bus decoded signal $\overline{\text{XADDLY}}$ is taken low, enabling the presetting of the delay counters M13 and M14 from the CMOS Data Bus, the amount of delay being determined by the selected range, function and filter state, see Fig. 3.43. The $\overline{\text{A-D}}$ control latches, M11 and M12 are then enabled by $\overline{\text{XADCTL}}$ to (i) reset the command latch M1 (from M11-4), (ii) set the resolution of the main counter (M11-5 and 6), (iii) select trigger gate (M12-3, 4 or 5) and (iv) reset the data ready latch (M12-6).

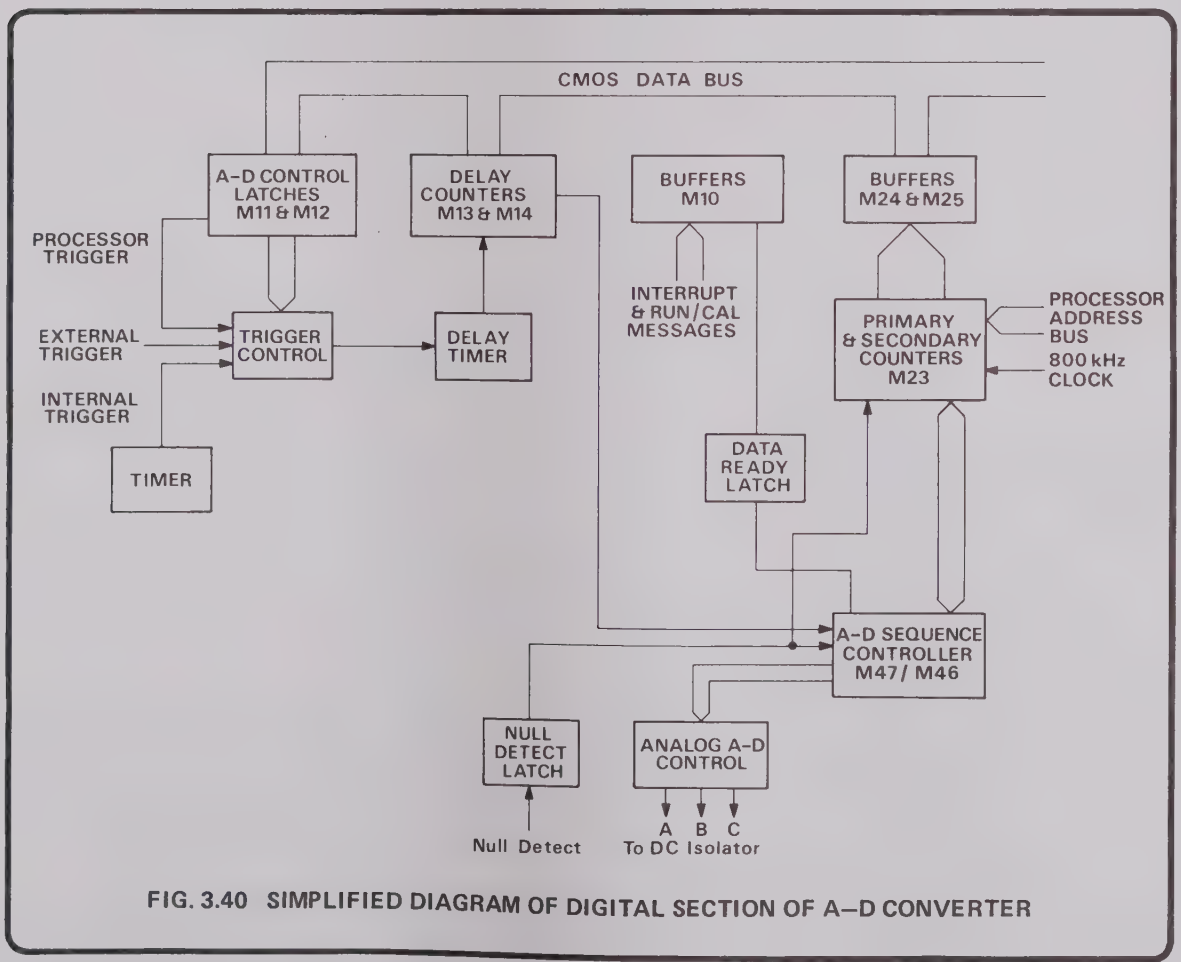


FIG. 3.40 SIMPLIFIED DIAGRAM OF DIGITAL SECTION OF A–D CONVERTER

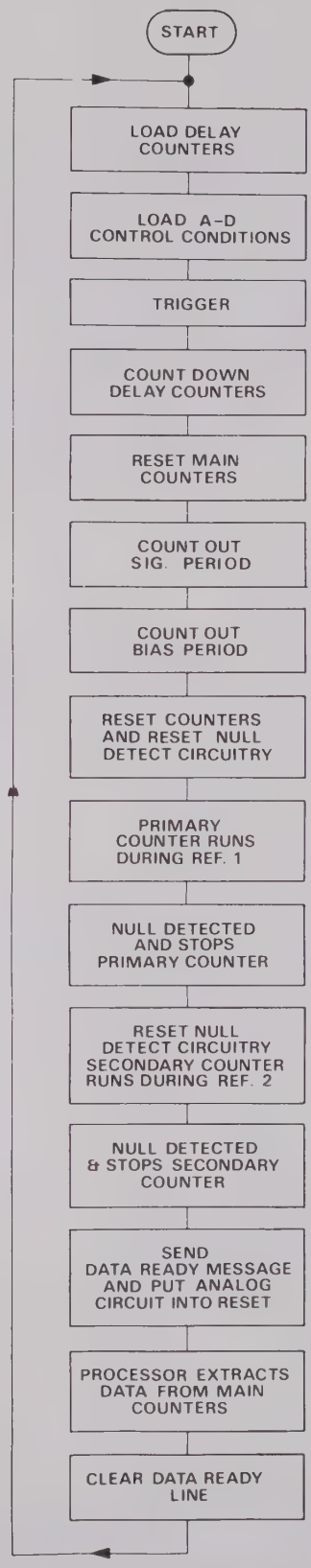

START
LOAD DELAY COUNTERS
LOAD A-D CONTROL CONDITIONS
TRIGGER
COUNT DOWN DELAY COUNTERS
RESET MAIN COUNTERS
COUNT OUT SIG. PERIOD
COUNT OUT BIAS PERIOD
RESET COUNTERS AND RESET NULL DETECT CIRCUITRY
PRIMARY COUNTER RUNS DURING REF. 1
NULL DETECTED AND STOPS PRIMARY COUNTER
RESET NULL DETECT CIRCUITRY SECONDARY COUNTER RUNS DURING REF. 2
NULL DETECTED & STOPS SECONDARY COUNTER
SEND DATA READY MESSAGE AND PUT ANALOG CIRCUIT INTO RESET
PROCESSOR EXTRACTS DATA FROM MAIN COUNTERS
CLEAR DATA READY LINE

FIG. 3.41 FLOWCHART OF A–D DIGITAL SECTION

SIGNAL	$\overline{A}$	$\overline{B}$	$\overline{C}$
RESET	1	1	0
SYNC	1	1	0
SIG	1	1	1
BIAS	0	1	1
WAIT	0	1	1
REF 1	1	0	1
REF 2	0	0	1
END	1	1	1

FIG. 3.42 A-D ANALOG SEQUENCE CONTROL SIGNALS

FUNCTION	1061 COUNT	
	$\overline{\text{FILTER}}$	FILTER
DC Volts	2	101
AC Volts	46	151
DC + AC Volts	46	151
Ohms	$2^{(1)}$	$101^{(1)}$
DC Current	$2^{(2)}$	101
AC Current	46	151
DC + AC Current	46	151

(1) 1MΩ Range $\overline{\text{FILTER}}$: 4, FILTER : 121
10MΩ Range $\overline{\text{FILTER}}$: 31, FILTER : 251

(2) 10mA Range : 3
100mA Range : 5
1A Range : 6

FIG. 3.43 COMMAND DELAYS

3.8.3.3 A-D Measurement Sequence

Trigger. The trigger, required to initiate the measurement sequence, is generated from one of three possible sources:

1. Internally generated 3/second trigger, from timer M61-7.

2. Externally generated trigger, from EXT TRIG on rear panel via M24-13.

3. A MPU derived trigger from M11-3 generated when auto-ranging, pressing MANUAL when HOLD selected, during calibration, an INPUT ZERO sequence or via the digital interface.

The trigger source is selected by the latched data on M12, enabling one of the three gates of M2.

Delay. The trigger pulse clocks the 'command latch' M1 causing the timer, M15, to output clock pulses (200Hz) to the delay counters (M13 and M14) after a delay of approx. 1.5mS set by C5, R8, R9, R11. The delay counters proceed to count down to zero, at which time the delay latch (M26) is clocked. Thus M26-14 becomes a logic '1', enabling the sequencer M47 (an octal counter) to proceed on to the next step via M46-2.

SYNC. The SYNC phase from the sequencer resets the counters of M23 and places the analog section of the A-D into SIG. The pulse is fed back to M47 via M46-3 to step on the sequencer.

SIG. During the time the SIG line is high (M47-3), the primary counter in M23 is enabled and counts out the signal period (2.5mS superfast or 20mS normal mode). At the end of this period, M23-23 goes high and passes via M46-10 enabling the sequencer to step on once again.

BIAS. The BIAS signal (M47-7) is transferred to the analog section of the A-D by changing the state of the $\overline{A}$ line (M38-9 to a logic '0'). BIAS also enables the secondary counter of M23 to count out the BIAS period (20μS). The signal indicating the end of this period is passed via M46-9 causing the sequencer to carry on to the next step. The BIAS signal also resets the 'delay latch' (M26) ready for the next measurement cycle, and the 'null detector' latch (M22A).

WAIT. The WAIT pulse resets the counter of M23 via M39-10, keeps the $\overline{A}$ line to the analog section low, clocks the polarity null detect latch M22(B) causing a logic '1' on pin 1 if the signal applied to the analog section of the A-D converter was positive (logic '0' if negative) and is fed back to enable the sequencer via M46-3.

REF 1. The high to low edge of WAIT causes the $\overline{A}$ to change state and going into REF 1 makes $\overline{B}$ a logic '0'. The analog side is then in the condition to start 'ramping down'. While REF 1 is high the primary counter of M23 is enabled (pin 3) and counts the period of REF 1.

REF 1 is ended when a null detector pulse is detected and latched on to M22. This causes the sequencer to step on once more from M46-3, the low to high edge from pin 4 disabling the primary counter.

REF 2. The REF 2 signal changes the state of the $\overline{A}$ line (causing the analog section to ramp down at a slower rate), reset the 'null detect' latch and enable the secondary counter of M23 (Pin 13) to count the period of REF 2. If the secondary counter overflows the primary counter is incremented from M26-16.

As in REF 1, a null detector pulse causes the counting period to end (M26-13) and increment the sequencer via M46-3 causing the $\overline{A}$ and $\overline{B}$ lines to change state.

END. The low to high edge from M47-10 is fed back to M47, via M48-6 giving a master reset. Thus the sequencer is placed into RESET.

RESET. The sequence pulse from M47-2 clocks the 'data ready' latch M1-3 placing a signal on to the CMOS Data Bus via tri-state buffer M10 indicating to the MPU that a reading is ready to be taken from the main counter M23. Data is extracted from the counters in three bytes (controlled by the A1 and A0 lines of the processor address bus) with the counter output buffers, M24 and M25 being enabled by $\overline{XADDT}$, a decoded processor address.

The RESET signal is also passed to the analog section of the A-D by changing the state of the C line.

Once the data has been extracted from the main counter the set-up procedure is then repeated to await a further trigger.

3.8.3.4 Master Clock and Line Locking (430329 sheet 4)

To give improved rejection of line frequency related noise, the 1061 is linelocked. The line frequency is sampled and compared to the internal master clock. Synchronisation is achieved by adjusting the master clock frequency.

A sinusoidal line frequency signal from the 5V mains tap is converted to a square-wave (M25-13) and $\div 2$(M26-1) before being fed to the comparator section of the ULA M23 (sheet 3). The MASTER CLOCK $\div 2$ signal is fed to ripple counter M27 which outputs a signal of twice the estimated line frequency, for line related periods, controlled by the ULA (M23-18). This signal is fed to M23-19 (via inverter M39) and after a further $\div 2$, is compared with the actual line frequency (see Fig 3.44).

The ULA determines whether the master clock is running too slow or too fast, producing a signal on pin 20 whose pulse-width is proportional to the difference. The output of pin 21 is a 25Hz square-wave which is fed to the up/down input of counters M41/50. Thus depending on the position and down period of the pulse, the count held is increased or decreased.

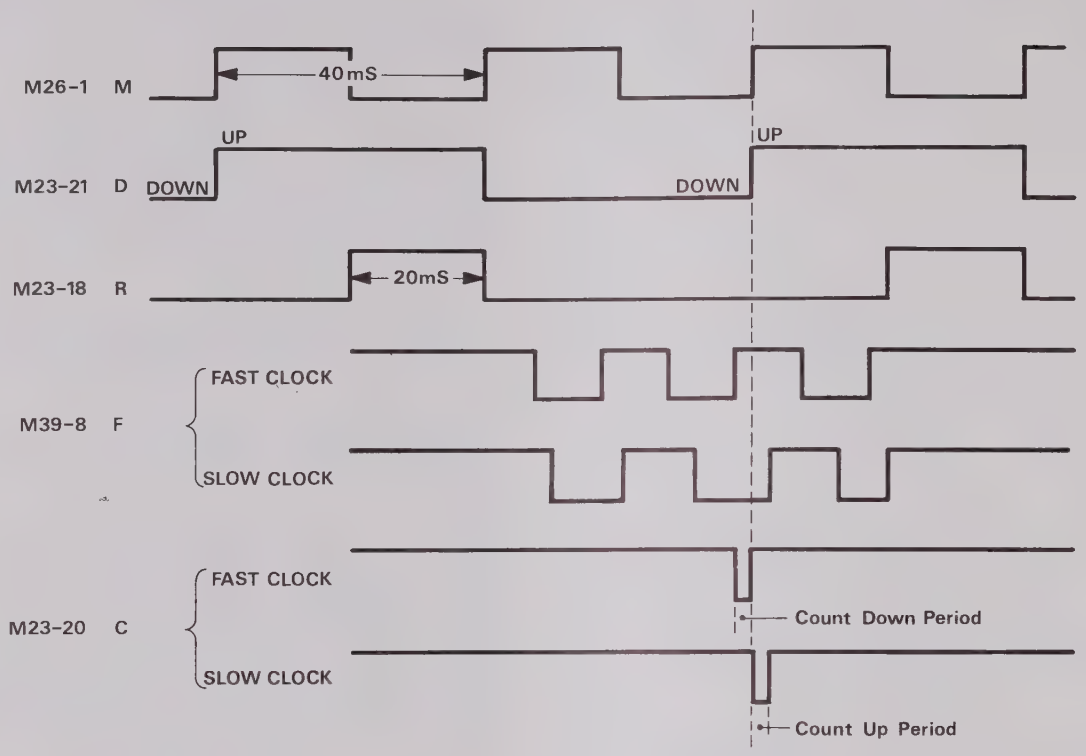


FIG. 3.44 LINE LOCKING TIMING DIAGRAM (50Hz)

Latches M42/51 are updated with this new count during the A-D RESET period and applies the count to resistor network AN4 which forms a D-A converter. Changing the voltage applied to varicap D9 alters its capacitance, thus adjusting the LC of the Colpitts oscillator. Therefore the frequency of the Master Clock is increased or decreased to be an exact multiple of the mains frequency.

3.9 FRONT PCB ASSEMBLY (Circuit Drawing No. 430294)

The Front pcb assembly accepts the measurement signals, digitally displays the value, provides manual control of the measurement circuits and data conditioning, and gives a visual status indication of the selectable instrument states.

3.9.1 Analog Input Signals (430294 sheet 2)

Signals applied to the front panel input terminals are routed directly to the rear panel board by two cables. The first takes the Hi and I+ lines and the second takes the lines Lo, I– and Ω's Guard. Both cables are screened by front panel Guard.

The front panel printed circuit board connects the front panel signal input terminals to the 2-4 wire and Local-Remote switches. Thus I+ and I– are wired to the 2-4 wire switch through thermistors R1 and R2 for connections to Hi and Lo if required. Similarly Ω's Guard and Guard may be shorted via the Local/Remote switch.

3.9.2 Display Signals (430294 sheet 1)

The front panel assembly routes the display signals from the Display Driver board to the gas discharge display.

3.9.3 Keyboard Data Encode (430294 sheet 1)

Selection of a front panel keyswitch causes one of the two 16-key encoders (M7 or M10) to send a data available message to M2 (a data latch) and to remember which key was pressed. The output of M2, (pin 1 or 13) signals the interrupt circuitry of the Digital Board (IRQK1 or IRQK2).

When the microprocessor accepts the interrupt and has located the source, the XKY BRD line to pin 13 of M7 and M10 is taken low, enabling the data outputs of the encoders to be placed on to the CMOS data bus (See Fig. 3.45 for the key select coding). This signal also resets M2 ready for the next key selection.

KEY	M7			
	14	15	16	17
	CD7	CD6	CD5	CD4
100	0	0	0	0
10	0	0	0	1
1000	0	0	1	0
10MΩ	0	0	1	1
1	0	1	0	0
.1	0	1	0	1
10Ω	0	1	1	0
AUTO	0	1	1	1
DC	1	0	0	0
kΩ	1	0	0	1
KEYBOARD	1	1	0	1
I	1	1	1	0
INPUT ZERO	1	1	1	1

KEY	M10			
	14	15	16	17
	CD3	CD2	CD1	CD0
HOLD	0	0	0	0
RATIO	0	0	0	1
TEST	0	0	1	0
ERROR	0	0	1	1
(A–B)	0	1	0	0
Av	0	1	0	1
÷ C	0	1	1	0
MAX	0	1	1	1
MIN	1	0	0	0
RESET	1	0	0	1
MAN	1	0	1	0
INPUT FILTER	1	1	0	1
AC	1	1	1	1

FIG. 3.45 CMOS DATA BUS : KEY SELECT CODING

3.9.4 Keyboard L.E.D. Data Decode (430294 sheet 1)

The XKY BRD signal is inverted by Q1, R7, C1, R6 partially enabling the L.E.D. data latches M4, M5, M6, M8, M9, M11 and M12 while information is not being extracted from the keyboard encoders. The data latches are divided into four sets, M6 and M4, M8 and M5, M12 and M11, M9 being fully enabled from the XKD SPØ – XKD SP3 lines respectively.

On initialisation or after a change of the instrument's selectable states, the L.E.D. data latches are updated by placing data on the CMOS Data Bus (See Fig. 3.46), firstly to M8 and M5 (enabled from XKD SP1) and 'clocking' from the CMOS CLK line (J2-6), secondly to M12 and M11, then M9 and finally M6 and M4.

The output of the L.E.D. latches provide the signals to the bases of the L.E.D. drive transistors, switching them on or off as required.

CMOS DATA LINE	M12/M11	M8/M5	M6/M4	M9
CDO	÷C	DC	AUTO	
CD1	Av	kΩ	10Ω	
CD2	ERROR	INPUT ZERO	.1	
CD3	TEST	INPUT FILTER	1	
CD4	A–B	KEYBOARD	10	
CD5	MIN		100	MAN
CD6	MAX	I	1000	RATIO
CD7	RESET	AC	10MΩ	HOLD

FIG. 3.46 CMOS DATA BUS : LED-SELECT CODING

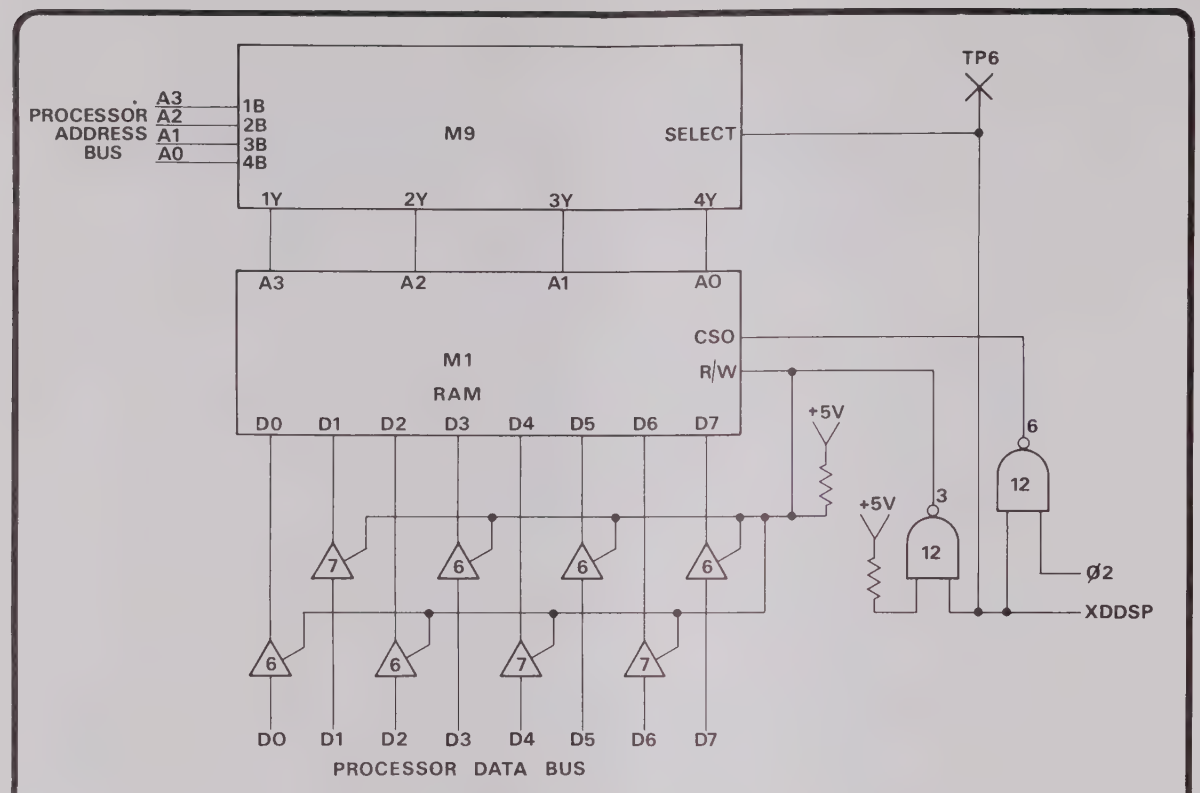


FIG. 3.47 DISPLAY DRIVER WRITE CIRCUITRY

COUNTER (M8)				RAM (M1)				Display block energised or operation implemented from M11
Q_3	Q_2	Q_1	Q_0	A_3	A_2	A_1	A_0	
0	0	0	0	0	0	0	0	1
0	0	0	1	0	0	1	0	3
0	0	1	0	0	1	0	0	5
0	0	1	1	0	1	1	0	7
0	1	0	0	1	0	0	0	9
0	1	0	1	1	0	1	0	11
0	1	1	0	1	1	0	0	
0	1	1	1	1	1	1	0	
1	0	0	0	0	0	0	1	2
1	0	0	1	0	0	1	1	4
1	0	1	0	0	1	0	1	6
1	0	1	1	0	1	1	1	8
1	1	0	0	1	0	0	1	10
1	1	0	1	1	0	1	1	Reset Counter

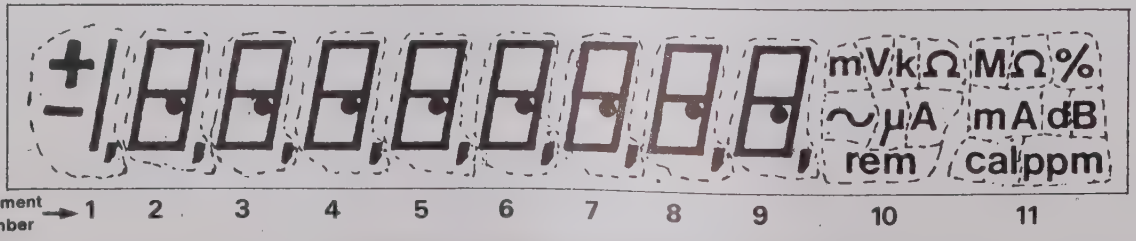


FIG. 3.48 DISPLAY DRIVER READ MODE ADDRESS STATES

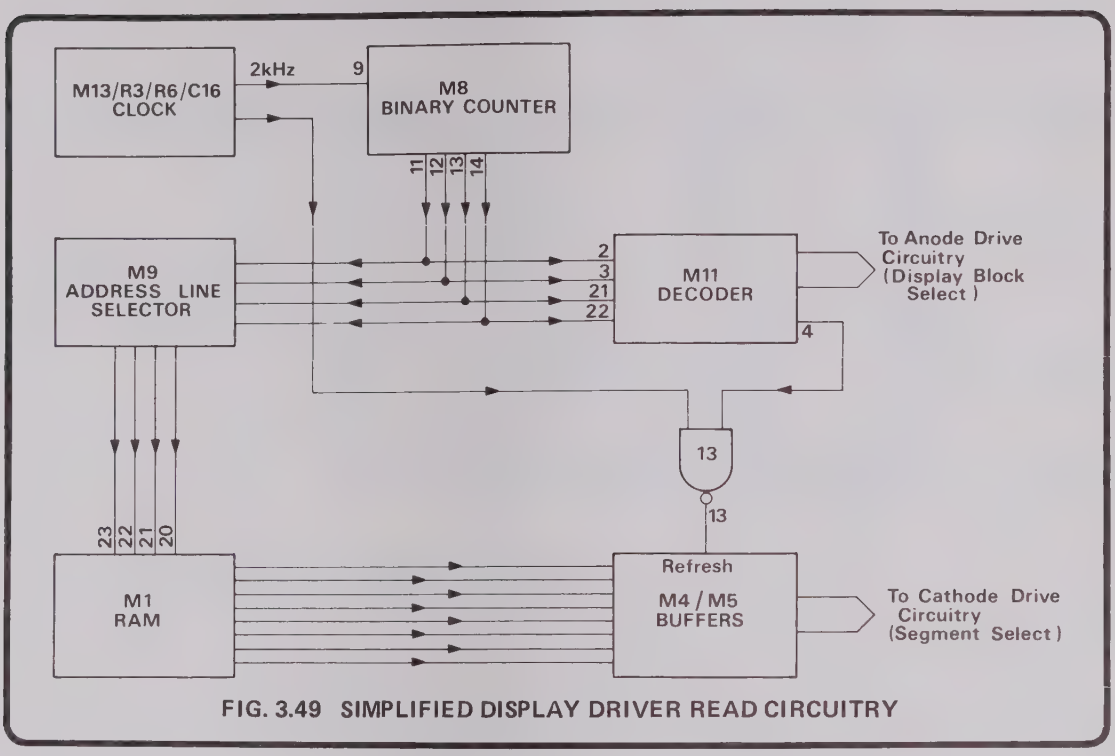


FIG. 3.49 SIMPLIFIED DISPLAY DRIVER READ CIRCUITRY

3.10 DISPLAY DRIVER ASSEMBLY (Circuit Drawing No. 430330).

Basically, the Display Driver assembly receives the display information from the microprocessor (running at 800kHz) and stores it in a Random Access Memory (RAM) digit by digit. This data is then read out at a slower frequency (2kHz), level shifted and output to the gas discharge display.

NOTE: In the following description, each bar, decimal point or legend is referred to as a display segment and each set of segments i.e. ±1, ⊟ or a legend block, is referred to as a display block.

3.10.1 Write Mode

On completion of a reading or when certain modes are selected, (e.g. ERROR, keyboard entry), the processor indicates to the Display Driver Board that data is ready to be transferred by the signal XDDSP (TP6). This causes the RAM (M1) to be placed into its write mode and the quadruple 2-line to 1-line data selector, M9, to select the 'B' inputs which are connected to the processor address bus.

The signal XDDSP also causes the tri-state buffers M6 and M7 to become enabled, causing the data input lines of the RAM to be connected to the processor data bus. Thus under MPU control, the display data (±1, ⊟ 's, decimal points and legends) is written into the RAM.

Once this transfer of data is complete the RAM becomes deselected, the buffers return to their third state inhibiting the data bus to the RAM and connects the 'A' inputs of M9 to the address lines of the RAM.

3.10.2 Read Mode

Discharge between adjacent display blocks is prevented by time multiplexing and sending information to alternate blocks. A particular display block is selected by driving the anodes, and a particular segment by driving the cathode.

The free running clock M13, R3, R6, C16, produces a 2kHz signal (M13-9) to drive a 4-bit binary counter, M8, which provides the control of the address lines in the read mode (See Fig. 3.49). The display block selection is achieved by decoding these 4 lines into 16 bits using M11. The output lines of M11 are connected to the bases of transistors Q1-Q3, Q13-Q20 which act as anode switches. Note that when the address lines are in the state 0000 the output of M11 (pin 11) selects the anode to block 1, 0001 selects the anode to block 3 (M11-9), 0010 ... block 5, etc., thus the display blocks are selected alternately.

To select the appropriate segment data from the RAM to match the display block selection the address lines are given a left hand bit rotation, i.e. if the output of M8 is labelled DCBA, (2^3, 2^2, 2^1, 2^0), the address input of M1 would be CBAD. (Fig. 3.48 gives the state of the address lines for each display block). The particular display block segment data is recalled by the RAM, buffered by M4 and M5, level shifted −180 volts by R8-R15, C4-C11 causing Q5-Q12 to drive the cathodes, D1-D10 acting as restoration diodes. Between the transfer of each set of segment data, M13-3 is taken high, causing the outputs of M4 and M5 to be a logic '0'. This produces a refresh period for capacitors C4-C11 to discharge from the −180V supply through the restoration diodes.

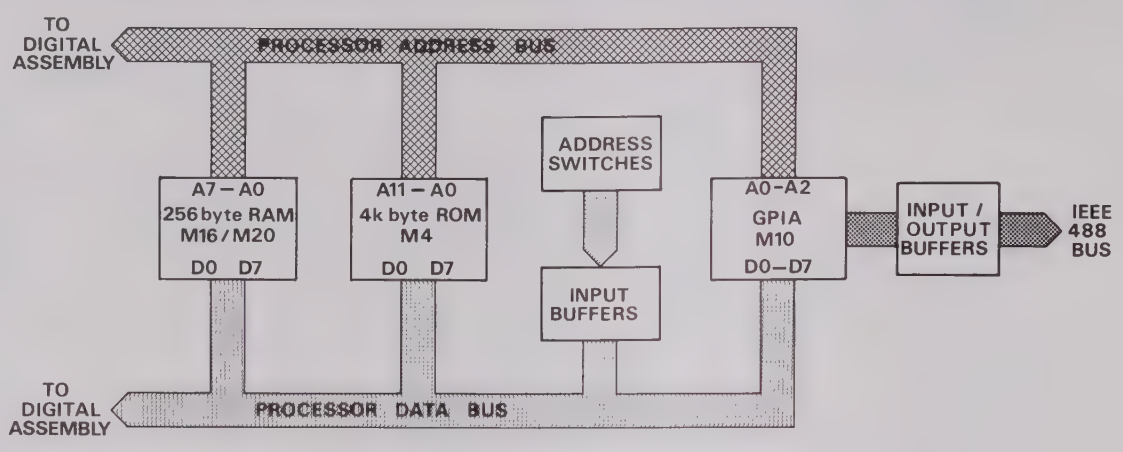


FIG. 3.50 SIMPLIFIED DIAGRAM OF IEEE ASSEMBLY

3.11 IEEE DIGITAL INTERFACE (Circuit Drawing No. 430306)

The IEEE Digital Interface assembly contains the extra memory and circuitry required for the execution and decoding of interface functions, and to perform data input/output transfers. Simplified diagram Fig. 3.50 shows the essential features of this board.

3.11.1 RAM/ROM Circuit

The IEEE Digital Interface assembly acts as an extension to the Digital assembly with connections to both the Processor Address and Data Buses. The board contains 4k bytes of program memory (M4) containing the subroutines to control the instrument from the IEEE 488 Bus. Extra 'Operating ('scratch pad') Memory' is provided by two 256 x 4 bit RAMS (M16, M20). Both the ROM and the RAM's receive the address information, with chip selection being made by decoding address lines A3-A11 with XIOBD.

3.11.2 Interface Circuit

The General Purpose Interface Adapter (GPIA). M10, provides the interface between the IEEE 488 Standard Instrument Bus and the 6800 microprocessor. The MPU can receive, process and send messages to the interface through the GPIA.

The GPIA is able to automatically handle the following interface protocol[1] :–

Single address capability
Source and acceptor handshake
Talker and Listener states
Service Request
Parallel Poll
Device Clear
Device Trigger

With the MPU it is also capable of:–
Programmable Interrupts
Storing the instrument's address
Control of the interface input/output buffers.

The GPIA is selected by decoding address lines A3-A11 with XIOBD. Address lines A0-A2 with the state of the MPU R/$\overline{W}$ line select one of the 8 read-only or 7 write-only registers in the GPIA, enabling the MPU to send or receive data over the interface.

The two signals T/$\overline{R}$1 and T/$\overline{R}$2 are used to control low power transceivers (formed from M1, 2, 5, 6, 8, 9, 11, 12, 13) which drive the interface bus.

[1] For further information refer to 'Getting aboard the 488 Bus' published by Motorola.

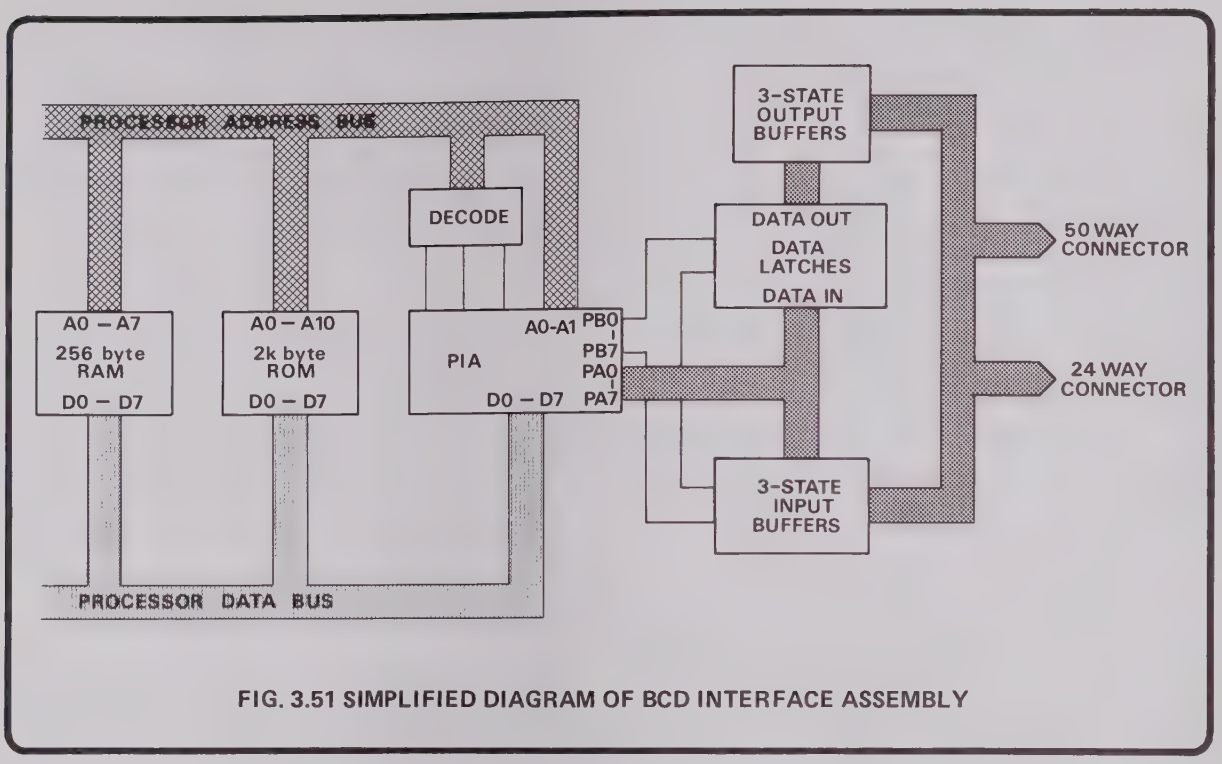


FIG. 3.51 SIMPLIFIED DIAGRAM OF BCD INTERFACE ASSEMBLY

3.12 BCD DIGITAL INTERFACE (Circuit Drawing No 430332)

The BCD Digital Interface assembly contains the extra memory and circuitry required for the execution and decoding of interface functions and to perform data output transfers. Simplified diagram, Fig 3.51 shows the essential features of this board.

3.12.1 RAM/ROM Circuit

The BCD Digital Interface assembly acts as an extension to the Digital assembly with connections to both the Processor Address and Data Buses. The board contains 2k bytes of program memory (M11) containing the sub-routines to control the instrument from the BCD Interface. Extra 'operating (scratch pad) memory' is provided by two 256x4 bit RAMS (M22, M23). Both the ROM and RAM's receive the address information, with chip selection being made by decoding address lines A8-A11 with XIOBD, R/$\overline{W}$ and Ø2.

3.12.2 Interface Circuit

The Peripheral Interface Adapter (PIA), M1, provides the means of interfacing the BCD input/output to the 6800 microprocessor. The PIA is selected by decoding address lines A9-A11 with XIOBD. Address lines A0 and A1 together with MPU data messages configure the six internal registers controlling data flow and external control signals.

Peripheral Data lines PBO-PB7 (M1 pins 10-17) are used as enable lines allowing data to be placed on the BCD Data Bus from the Remote Programming Input and control lines of the BCD Output (2 bytes) and allowing data to be placed into output latches M7-M10, M12-M16 (5 bytes).

The length of PRINT COMMAND is controlled by the timer M2, R1, C3.

3.13 REAR (POWER SUPPLY) PCB ASSEMBLY (Circuit Drawing No. 430295)

3.13.1 General

The line transformer and power supply components are situated at the rear right hand side of the instrument, when viewed from the front. Transformers T1 and T2 are of toroidal construction mounted one on top of the other and bolted to the rear panel. T1 has a split primary comprising two 115V windings, intended for either series or parallel connection depending on the line voltage. An earth screen is interposed between primary and secondary windings to minimise electrostatic coupling, and is grounded to line earth. The second transformer T2 is driven from T1. It also possesses an electrostatic screen, this time being connected to Guard.

3.13.2 180V Supply

The 180V supply is required for the gas discharge display. Bridge rectifier W1 and C6 convert the 200V AC from the secondary of T1, to DC. R6, D3, D3, R4 and Q2 act as a constant current source being regulated by D4, R5 and Q1. The +5V line (TP2) is connected to the digital +5V line (TP3) on the Display Driver assembly.

3.13.3 5V Supply

All the logic circuitry to the right of the central printed circuit board is powered from the supply generated from the two 8.8 volt 750mA secondary windings on transformer T1. The centre tap (digital common) is referenced to line earth via a 100kΩ resistor, R1 in parallel with a 100nF capacitor, C1. The output of rectifying diodes D1 and D2 is smoothed by C7 and C8 before being fed to regulator M1. This regulator is capable of 1 amp output and has foldback current limiting and thermal shut-down, to provide short circuit protection.

3.13.4 ±15V Supply

The output of the third secondary winding of transformer T1 (10V AC) is input to the primary of T2. The two 19.25V outputs are connected in series, with the centre tap connected to analog common. The output of bridge rectifier W2 is fed to voltage regulators M2 and M3 (wired in series), to produce positive and negative 15 volt supplies to power the analog circuitry. These regulators also include foldback current limiting and thermal shut-down, to provide short-circuit protection.

3.14 SELF TEST SEQUENCE

Selection of the TEST key places the instrument into a test routine, checking the display and basic measuring circuits. A flowchart for the routine is given in Fig. 3.53. The analog circuitry conditions for each test are given in the last subsection of the circuit description for the particular board, and the range 'F.E.T.' patterns in Appendix I-8.

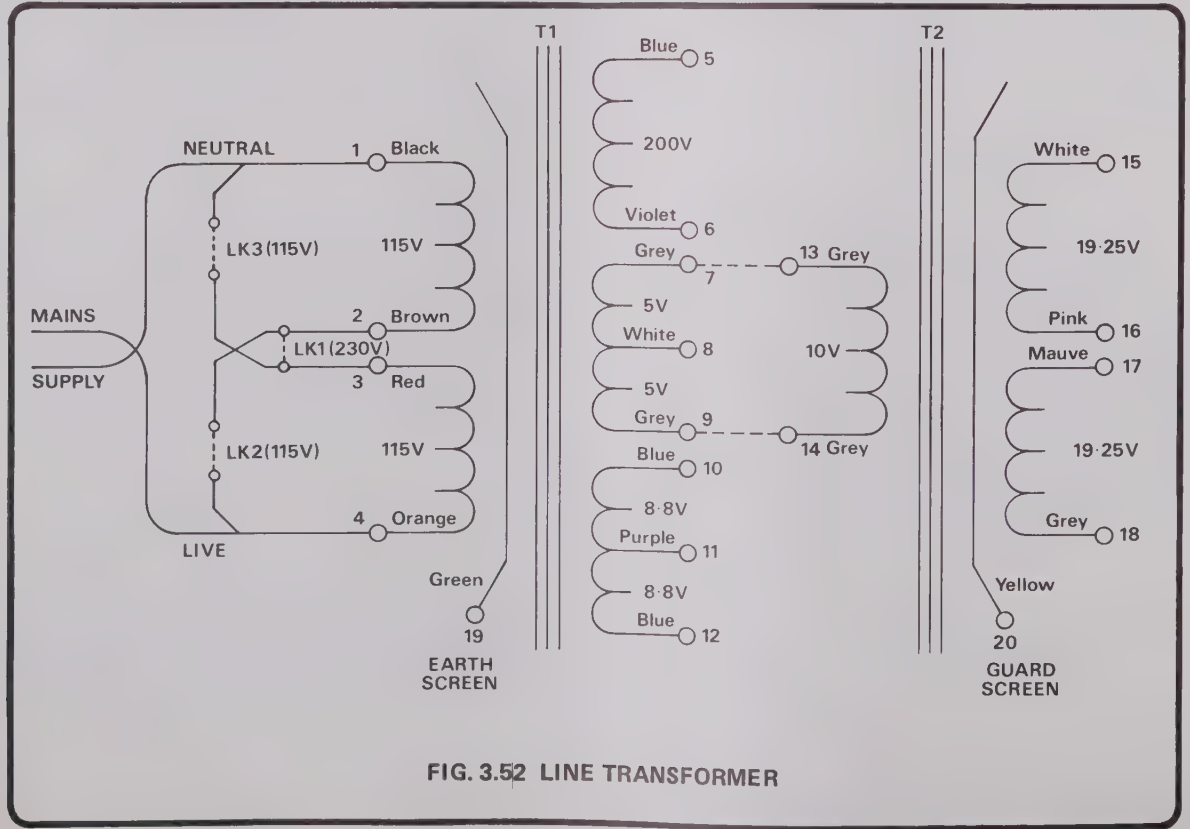


FIG. 3.52 LINE TRANSFORMER

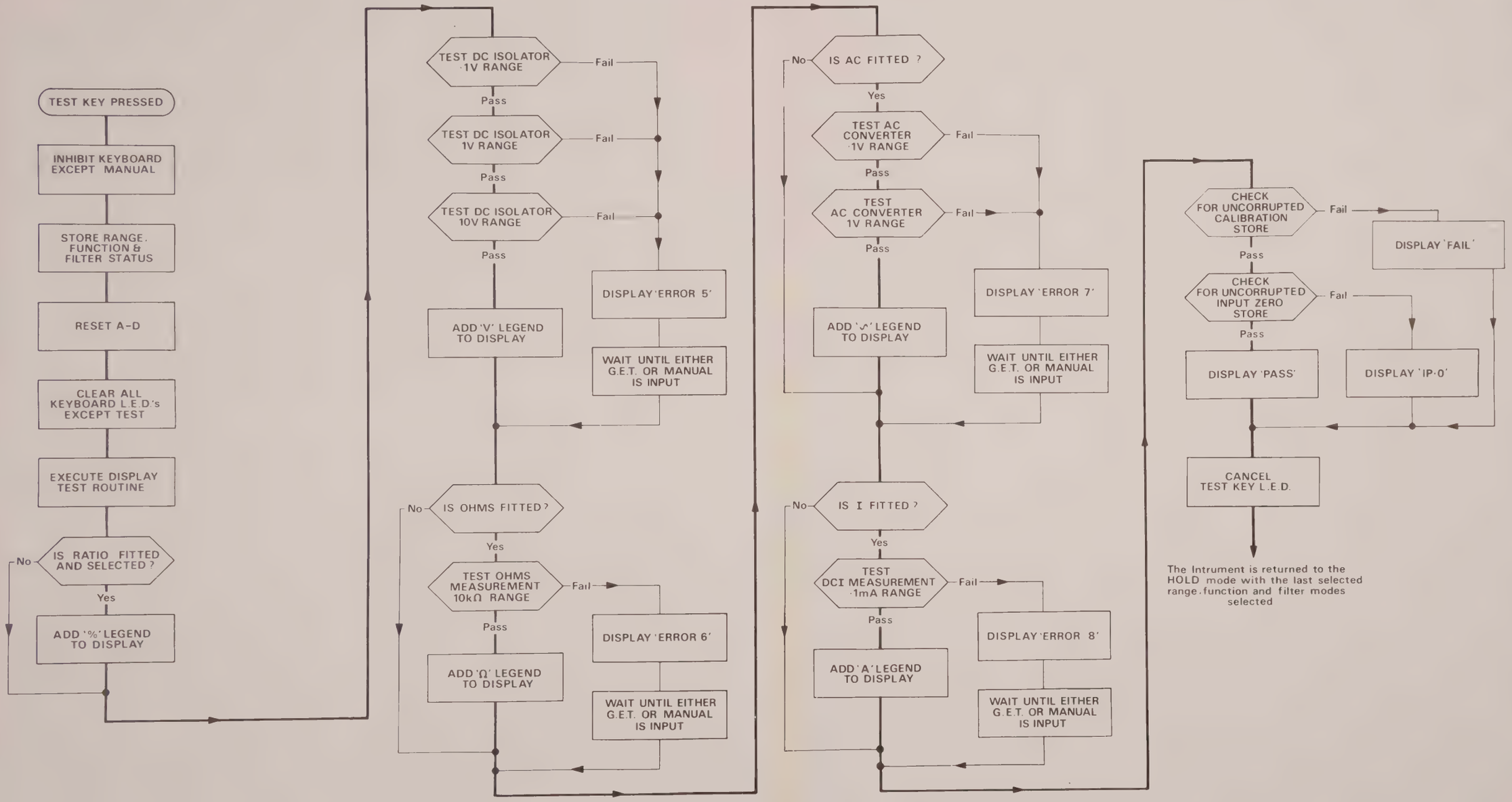


FIG. 3.53 FLOWCHART OF SELF-TEST ROUTINE

SECTION 4

INTERNAL ADJUSTMENT PROCEDURES

4.1 ALTERATION OF LINE VOLTAGE AND LINE FREQUENCY

The instrument is set to 50Hz, 205V to 255V supplies unless Option 80, 81 or 82 is specified. This information is carried on the instrument identification label located on the rear panel. Alteration to a different line voltage/line frequency may necessitate an instrument recalibration.

4.1.1 Changing Line Voltage

1. Disconnect power and all signal input/output leads.
2. Remove the lower cover.
3. Locate the link(s) connecting the split primary on the printed circuit board in front of the toroidal line transformer, Fig. 2.1 and Drawing No 400295.
4. 115V Operation:— Remove LK1 (link 1) and fit LK2 and LK3[1].
   230V Operation:— Remove links LK2 and LK3, and fit LK1[1].
5. Amend instrument identification label.
6. Replace lower cover.
7. Replace power fuses with 160mA anti-surge (230V) or 500mA anti-surge (115V).
8. Carry out the Specification Verification tests (Section 8, User's Handbook) and recalibrate if necessary.

4.1.2 Changing Line Frequency

1. Disconnect power and all signal input/output leads.
2. Remove the top cover.
3. 400Hz Operation:— Remove link LK5 and fit LK7[1] on the Digital assembly, (Drawing No. 400329).
   50/60Hz Operation:— remove link LK7 and fit LK5[1] on the Digital assembly (Drawing No. 400329).
4. Place instrument into HOLD. Adjust L2 (Digital assembly) so that TP7 is 1.05V ±0.03V with respect to Digital Common (TP28).

NOTE: This signal contains about 200mV peak-to-peak high frequency noise.

5. Amend instrument identification label.
6. Replace the top cover.
7. Carry out the Specification Verification tests (Section 8, User's Handbook) and recalibrate if necessary.

[1] Links should be 22 SWG TIN.Cu wire with silicone rubber sleeving.

4.2 BATTERY REPLACEMENT

The battery should be replaced on or before the date indicated on the rear panel instrument identification label. To retain the calibration memory, the instrument must be powered-up during replacement. Therefore great care must be taken due to voltages up to 260 volts being present inside the instrument.

1. Remove top cover and locate battery on the Digital assembly (see Fig. 2.1).
2. Power-up instrument.
3. Desolder battery at end of tags and remove from clip.
4. Replace with new battery, (Datron Part No. 920049) positive terminal to resistor.
5. Replace top cover.
6. Amend instrument identification label (Current date + 5 years).
7. Carry out the Specification Verification tests (Section 8, User's Handbook) and recalibrate if necessary.

4.3 POST-REPAIR PROCEDURES

Apart from the RMS Module (which is available only from Datron), all integrated circuits and semiconductor devices are standard manufacturers' products, and special selection is unnecessary. During manufacture certain resistors are selected in value (FSV = Factory Selected Value) to accommodate circuit component tolerances, or to bring the desired setting of a preset control to the middle of its adjustment range.

The thermal tracking of the DC Preamplifier is particularly important, to ensure a low order of zero drift with variations of temperature. This rather time consuming procedure is carried out initially during manufacture, and need only be repeated following replacement of Q12 or any component associated with the temperature compensation circuitry.

NOTE: A routine calibration as detailed in Section 1 should be carried out after completion of the following procedures.

CAUTION : Up to 260 volts is present inside the instrument. Personal contact with these points may result in injury.

4.3.1 Basic DC Instrument

Equipment Requirements:

4½ digit Digital Voltmeter e.g. Datron 1041
Variable 5V, 1 amp DC supply
5mV/division Oscilloscope e.g. Telequipment D83
1MΩ5% resistor in parallel with 10nF capacitor
10MΩ5% resistor in parallel with 10nF capacitor
DC Voltage Calibrator, e.g. Fluke 332D with correction figures.

Procedure:

Power Supplies

1. Turn instrument on and allow 5 minutes warm-up period.

2. Connect DVM Hi to TP8 and Lo to TP28 on the Digital assembly. Adjust R2 on the Rear (Power Supply) pcb assembly to give +5.100V ±25mV.

3. Connect DVM Hi to TP1 and Lo to TP20 on the Analog assembly. Adjust R7 on the Rear (Power Supply) pcb assembly to give +15.000V ±15mV.

4. Connect DVM Hi to TP2 and Lo to TP20 on the Analog assembly. Adjust R12 on the Rear (Power Supply) pcb assembly to give −15.000V ±15mV.

Digital Assembly

5. Switch the instrument off and disconnect the power lead.

6. Isolate the Digital Board by removing the connectors along the centre panel (J1-J5).

7. Connect variable 5V supply and DVM Hi's to TP8, Lo's to TP28. Reduce supply to 4.750V ±10mV.

8. Set R83 fully clockwise. Connect oscilloscope Lo to TP28 and monitor M53 pin 40. Turn R83 anti-clockwise until TP30 undergoes a high to low transition (or begins to pulse low).

9. Remove variable supply and reconnect items disconnected in steps 5 and 6. Disconnect the oscilloscope. Switch on the instrument.

10. Connect DVM Hi to battery positive terminal, Low to TP28. Check battery voltage is >2.5 volts.

11. Disconnect DVM and connect oscilloscope Hi to TP25, Lo to TP28. Adjust R11 to give a 6mS ±0.5mS period, mark-space ratio 3.5 : 1.5.
NOTE: This signal appears in short 'bursts' every reading.

12. Place instrument into HOLD. Connect oscilloscope Hi to TP7. Adjust L2 to give a stable +1.05 ±0.03V.
NOTE: This signal contains about 200mV peak to peak high frequency noise.

13. Insert calibration key into keyswitch on the back panel and turn, placing the instrument into CAL mode.
NOTE: The display CAL legend will be lit.

14. Short together pins 'D' and 'E' on Digital assembly.
NOTE: All the calibration store correction factors are now reset to zero.

15. Turn the calibration key back to RUN mode.

Analog Assembly (DC Isolator Section)

16. Centralize R150 and R160.

17. Select 0.1V range DC with FILTER out. Apply a 10MΩ resistor between instrument Hi and Lo. Connect DVM Hi to TP13, Lo to TP20.
Adjust FSV R152 with a metal film resistor (50ppm/°C) for a reading of < 10mV, using R159 for 'fine' adjustments.
Do not solder in R152.

18. Apply a short circuit across the input terminals and adjust R150 for a reading of < 50μV at TP13.

19. Connect DVM Hi to TP33 and adjust R160 for a reading of <20μV.

20. Repeat steps 17 to 19 until readings are within specified limits.

NOTE: The following step is only required after the replacement of Q12 or any component associated with the temperature compensation circuitry.

21. (i) Re-apply 10MΩ resistor across the input terminals. Note the reading on the front panel display (=A).
    (ii) Note the ambient temperature (=X°C).
    (iii) Place the instrument in a temperature controlled oven at approx 50°C without top cover and with power 'on'.
    (iv) Leave the instrument for at least 1 hour then note the reading on the display (=B) and the temperature of the oven (=Y°C).
    (v) Compute (B−A)/(Y−X) = Drift/°C.
    (vi) Remove instrument from oven and allow to stabilize, with power 'on' to ambient for one hour.
    (vii) If the drift was <10 digits/°C proceed to (x).
    (viii) For drifts in excess of 10 digits/°C R151 must be adjusted. If the drift was positive turn R151 clockwise, if negative turn R151 anti-clockwise.
    (ix) Repeat from (i).
    (x) Lock R151 with a clean soldering iron.
    (xi) Repeat steps 17 to 20.

22. Solder in R152, with instrument turned off.

Analog Assembly (A-D Converter)

23. Select 100V range and apply short circuit between Hi and Lo. Connect DVM Hi to TP7, Lo to TP20. If reading is +6.42V ±0.03V proceed to step 25.

24. Switch off instrument and make positive reference links B & C, if cut i.e. the links alongside TP7. Switch on instrument and measure voltages on TP7 once again. Consult Fig. 4.1 and cut links as indicated. Repeat step 23.

Voltage on TP7 or TP8	TL'B'	TL'C'
6.42	–	–
6.47	–	✓
6.525	✓	–
6.58	✓	✓

Select voltage closest to measured value and cut links

FIG 4.1 REFERENCE SELECTION VOLTAGES

25. Connect DVM Hi to TP8. If reading is –6.42V ± 0.03V proceed to step 27.

26. Switch off instrument and make negative reference links A to C, if cut i.e. the links alongside TP8. Switch on instrument and measure voltage on TP8 once again. Consult Fig 4.1 and cut links as indicated. Repeat Step 25.

27. Select HOLD. Connect DVM Hi to TP9. Select correct resistance value for FSV R11 or R15 to give a reading of 0V ±1mV. Solder in resistor.

28. Deselect HOLD and disconnect DVM. Select 1000V range and apply +19mV. Connect oscilloscope Lo to TP21, Hi to TP5. Adjust R20 for noisy waveform at zero point.

29. Remove oscilloscope. Replace covers but do not replace screws. Select 1V, DC, filter out and apply 1MΩ across input terminals. Turn rear panel keyswitch to CAL mode and select LIN.

30. Select .1V range and apply 10MΩ across input terminals. Select Ib. Repeat until display reads less than 50 digits.

31. Select 10V range, FILTER and apply short copper link across input terminals. Select ZERO.

32. Apply +10 volts and select GAIN. Repeat until display reads +10.0000 ± ½ digit.

33. Apply +19 volts. If the display reads within the limits +18.9999 to +19.0001, proceed to step 35.

34. Calculate E = (19 – displayed reading)/2.
Re-apply +10 volts and adjust R23 for a displayed reading of 10 – E.
Repeat steps 32-34 until both readings are within the limits indicated.

35. Turn rear panel keyswitch to RUN mode.

The basic DC only instrument set-up procedure is complete.

4.3.2 Ohms Assembly

Equipment Required :
5½ digit Digital Voltmeter e.g. Datron 1051 or 1061.
10MΩ5% resistor in parallel with 10nF capacitor.
Copper shorting links.

Procedure

1. Centralize R26 and R27. Cut test links TL4 and TL5, and make TL6.

2. Select kΩ, 10kΩ range and set the instrument for 4-wire measurement on the front panel. Connect I– to Ω Guard, I+ to Hi and 10MΩ between Hi and Lo. Connect DVM Hi to TP4, Lo to TP1. Adjust R26 for zero ±300μV.

3. Remove 10MΩ resistor and replace with a short circuit. Connect DVM Hi to 'LO OUT' (J1-5) and adjust R27 for zero ± 2μV.

4. Repeat steps 2 and 3 until readings are within specified limits.

5. Connect Lo to Ω Guard with a short copper link.
Connect shorting link between TP1 and TP7.
Connect DVM Hi to TL6, Lo to TL1. If reading is $<50\mu V$ proceed to step 6.
Adjust FSV R40 if $>+50\mu V$ or FSV R39 if $<-50\mu V$.

NOTE: R39, R40 must be $\geqslant$100kΩ.

6. Remove link between TP1 and TP7 and connections on front panel. Reconnect TL4 and TL5. Cut TL6.

The basic Ohms set-up procedure is complete.

4.3.3 AC Assembly

Equipment required:

4½ digit Digital Voltmeter e.g. Datron 1041.
5mV/division Oscilloscope e.g. Telequipment D83.
AC Calibrator e.g. Fluke 5200A.
5:1 asymmetric crest factor signal, 1 volt r.m.s., 0.02% accuracy.

Procedure

1. Select AC 1000V range and HOLD. Short Hi to Lo. Connect DVM Hi to TL7, Lo to TP8 and note reading. Select 1V range and adjust R121 (bias current) to give same reading ±10μV.

2. Select 100mV range, AC + DC and adjust R112 (offset adjust) for an indication of zero ±50μV on the DVM.

3. Repeat steps 1. and 2. until readings are within the specified limits.

4. Select 10V range and HOLD. Connect oscilloscope Hi to TP5, Lo to TP8 and adjust R90 (rectifier zero) for maximum noise about zero. Remove the oscilloscope.

5. Connect DVM Hi to TP2, Lo to TP8 and adjust R75 (linearity) for an indication on the DVM of 1.8mV ±10%.

6. Select AC, 1V range, FILTER and apply 1V 500Hz. Connect DVM Hi to TL5, Lo to TP8. If reading is +3.157V ±0.01V proceed to step 8.

7. Disconnect input signal and switch off instrument, Make links TL1 to TL4 if cut. Switch on instrument, reselect AC, 1V range, FILTER and reapply 1V, 500Hz. Measure voltage on TL5. Consult Fig. 4.2 and cut links as indicated. Check voltage on TL5 is 3.157V ±0.01V. Remove the DVM.

Voltage on TL5	TL1	TL2	TL3	TL4
3.157	–	–	–	–
3.178	–	–	–	✓
3.198	–	–	✓	–
3.218	–	–	✓	✓
3.239	–	✓	–	–
3.259	–	✓	–	✓
3.280	–	✓	✓	–
3.300	–	✓	✓	✓
3.320	✓	–	–	–
3.340	✓	–	–	✓
3.360	✓	–	✓	–
3.380	✓	–	✓	✓
3.400	✓	✓	–	–
3.420	✓	✓	–	✓
3.440	✓	✓	✓	–
3.460	✓	✓	✓	✓

Select voltage closest to measured value and cut links

FIG 4.2 AC BOARD OUTPUT SELECTION VOLTAGES

8. Deselect HOLD and short circuit instrument Hi and Lo. Turn rear panel key switch to CAL mode and select ZERO. Repeat for all ranges.

9. Select 1V range. Apply 1 volt (d.c.) and note reading on display. Apply −1 volt (d.c.) and adjust R50 (d.c. turnover) for same display indication ±10 digits.

10. This part of the procedure must be performed with the high frequency compensation voltage, at J1-11/R57, at −5V ±0.2V.

    a. Select AC 100V range, FILTER and apply 100V, 500Hz. Select GAIN. Apply 100V, 50kHz and adjust C62 for a display of 100.000V ±20 digits.

    b. Apply 100V, 100kHz note error and adjust C61 to double the displayed error in the same direction.

    c. Repeat a. and b. until 50kHz and 100kHz displays are within ±20 digits.

    d. Select 1V range and apply 1 volt, 500 Hz. Select GAIN. Apply 1V 50kHz and adjust C63 for a display of 1.00000V ±20 digits.

11. Apply 1 volt 5:1 crest factor signal. Adjust R35 (crest factor) for a display of 1.00000V ±30 digits.

12. Open circuit input. Turn rear panel key switch to RUN. Select TEST and check for a display of PASS. Turn rear panel key switch to CAL.

13. Select 10V range and apply 10V, 50kHz. Check display is 10.0000V ±1200 digits. Check that the display can be calibrated to 10.0000 ±20 digits by less than 5 presses of the AC HF key.

14. Select 100mV range and apply 100mV 50kHz. Check display is 100.000mV ±500 digits. Check that display can be calibrated to 100.000mV ±20 digits by less than 5 presses of the AC HF key.

15. Select 1000V range and apply 1000V, 500Hz. Select GAIN.

16. Apply 1000V, 25kHz and check display is 1000.00V ±1200 digits. Check that display can be calibrated to 1000.00V ±20 digits by less than 5 presses of the AC HF key. Remove 1000V and turn rear panel key switch to RUN.

The basic AC set-up procedure is complete.

APPENDIX 1

ANALOG DATA LINE 'F.E.T.' PATTERNS

DC Voltage

Range		DC Isolator							
		AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
1	100mV	0	0	0	0	0	1	1	X
2	100mV	0	0	0	0	0	1	1	X
3	IV	0	0	0	0	1	1	1	X
4	10V	0	0	0	0	1	0	1	X
5	100V	0	0	0	0	1	1	0	X
6	1000V	0	0	0	0	1	0	0	X
7	1000V	0	0	0	0	1	0	0	X

AC Voltage

Range		AC assembly							
		AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
1	100mV	0	0	1	0	0	0	1	X
2	100mV	0	0	1	0	0	0	1	X
3	1V	0	0	1	0	0	0	0	X
4	10V	0	0	0	1	0	0	0	X
5	100V	0	0	0	0	1	0	0	X
6	1000V	0	0	0	0	0	1	0	X
7	1000V	0	0	0	0	0	1	0	X

DC Coupled AC Voltage

Range		AC assembly							
		AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
1	100mV	0	1	1	0	0	0	1	X
2	100mV	0	1	1	0	0	0	1	X
3	1V	0	1	1	0	0	0	0	X
4	10V	0	1	0	1	0	0	0	X
5	100V	0	1	0	0	1	0	0	X
6	1000V	0	1	0	0	0	1	0	X
7	1000V	0	1	0	0	0	1	0	X

Ohms

Range	DC Isolator								Ohms assembly							
	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
1 10Ω	0	0	0	0	0	1	1	X	0	0	0	0	0	0	1	X
2 100Ω	0	0	0	0	1	1	1	X	0	0	0	0	0	0	1	X
3 1kΩ	0	0	0	0	1	1	1	X	0	0	0	0	0	1	0	X
4 10kΩ	0	0	0	0	1	1	1	X	1	0	0	0	0	0	0	X
5 100kΩ	0	0	0	0	1	1	1	X	0	0	0	0	1	0	0	X
6 1MΩ	0	0	0	0	1	1	1	X	0	0	1	1	0	0	0	X
7 10MΩ	0	0	0	0	1	1	1	X	0	1	0	1	0	0	0	X

DC Current

Range	DC Isolator								Current assembly							
	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
1 100μA	0	0	0	0	0	1	1	X	0	1	0	0	0	0	1	X
2 100μA	0	0	0	0	0	1	1	X	0	1	0	0	0	0	1	X
3 1mA	0	0	0	0	0	1	1	X	1	0	0	0	0	0	1	X
4 10mA	0	0	0	0	0	1	1	X	1	1	1	0	0	0	1	X
5 100mA	0	0	0	0	0	1	1	X	1	1	0	1	0	0	1	X
6 1A	0	0	0	0	0	1	1	X	1	1	0	0	1	0	1	X
7 1A	0	0	0	0	0	1	1	X	1	1	0	0	1	0	1	X

AC Current

Range	AC assembly								Current assembly							
	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
1 100μA	0	0	1	0	0	0	1	X	0	1	0	0	0	1	0	X
2 100μA	0	0	1	0	0	0	1	X	0	1	0	0	0	1	0	X
3 1mA	0	0	1	0	0	0	1	X	1	0	0	0	0	1	0	X
4 10mA	0	0	1	0	0	0	1	X	1	1	1	0	0	1	0	X
5 100mA	0	0	1	0	0	0	1	X	1	1	0	1	0	1	0	X
6 1A	0	0	1	0	0	0	1	X	1	1	0	0	1	1	0	X
7 1A	0	0	1	0	0	0	1	X	1	1	0	0	1	1	0	X

DC Coupled AC Current

Range	AC assembly								Current assembly							
	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
1 100μA	0	1	1	0	0	0	1	X	0	1	0	0	0	1	0	X
2 100μA	0	1	1	0	0	0	1	X	0	1	0	0	0	1	0	X
3 1mA	0	1	1	0	0	0	1	X	1	0	0	0	0	1	0	X
4 10mA	0	1	1	0	0	0	1	X	1	1	1	0	0	1	0	X
5 100mA	0	1	1	0	0	0	1	X	1	1	0	1	0	1	0	X
6 1A	0	1	1	0	0	0	1	X	1	1	0	0	1	1	0	X
7 1A	0	1	1	0	0	0	1	X	1	1	0	0	1	1	0	X

TEST

Function Tested	Range Checked	DC Isolator								Option assembly							
		AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7	AD0	AD1	AD2	AD3	AD4	AD5	AD6	AD7
DC	.1	0	0	0	0	0	1	0	1								
	1	0	0	0	0	1	1	0	1								
	10	0	0	0	0	1	0	0	1								
kΩ	10	0	0	0	0	1	1	1	1	Ohms assembly 0	1	0	1	0	0	0	1
AC	.1	Not used								AC assembly 0	0	1	0	0	0	1	1
	1									0	0	1	0	0	0	0	1
I	.1	0	0	0	0	0	1	1	1	I assembly 0	1	0	0	0	0	1	1

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED
R1	090001	P.T.C. THERMISTOR	MULLARD	VA8650	2
R2	090001	P.T.C. THERMISTOR	MULLARD	VA8650	—
R3	000151	150Ω 1/4 W CARBON	MULLARD	CR25	8
R4	000151	150Ω " " "	"	"	—
R5	000151	150Ω " " "	"	"	—
R6	000102	1K 1/4 W. CARBON	"	CR25	1
R7	000104	100K 1/4 W. CARBON	MULLARD	CR25	1
R8	000151	150Ω 1/4 W. CARBON	MULLARD	CR25	—
R9	000151	150Ω " " "	"	"	—
R10	000151	150Ω " " "	"	"	—
R11	000151	150Ω " " "	"	"	—
R12	000151	150Ω " " "	"	"	—
AN1	090032	150Ω x 7 2% NETWORK	BECKMAN	764 - 1 - R150	2
AN2	090032	" " " "	"	"	—
C1	102101	100PF CER DISC	ERIE	801	1
C2	150002	10μF 20% 16V DIP TANT	UNION CARBIDE	K10E16	2
C3	150016	1·0 μF 20% 35V "	UNION CARBIDE	K1R0E35	2
C4	101103	0·01μF 250V CER DISC	ERIE	801	3

NOTES: CIRCUIT DIAG 430294
CHECK PROG. 460294
CHECK LIST 470294

SH.	C	D	1	2	3	4	5	6	7
1	—		RELEASED	ECO 778	BIG/BIB	867	888	1111	1213
2	—		17-8-78	29-9-78	6-12-78	25-JAN 79	11 JUN 79	26 OCT 79	21.4.80
3	—		MD	MD	MD	MD	MD	MD	MD

28-4-78 BJ

datron
1061/1071
FRONT P.C.B. ASSY
400294 2 6

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
C5	101103	0·01μF. 250V CER DISC	ERIE	801	—
C6	150016	1·0 μF 20% 35V DIP TANT	UNION CARBIDE	K1R0E35	—
C7	101103	0·01μF 250V CER DISC	ERIE	801	—
C8	150002	10μF 20% 16V. DIP TANT	UNION CARBIDE	K10E16	—
C9	104023	2n2F 20% 1kV CER DISC	ITT	HD16K102N2MS-SSIK0DSC	1
Q1	240001	Si NPN	NATIONAL	BC184K	6
Q2	240001	Si NPN	NATIONAL	BC184K	—
Q3	240001	" "	"	"	—
Q4	240001	" "	"	"	—
Q5	240001	" "	"	"	—
Q6	240001	" "	"	"	—
M1	290042	G.P. HIGH CURRENT. TRANS ARRAY	R.C.A.	CA3081P	3
M2	280011	DUAL D FLIP-FLOP	MOTOROLA	MC14013 BCP	1
M3	290042	G.P. HIGH CURRENT TRNS ARRAY	R.C.A	CA3081P	—
M4	280015	QUAD LATCH	MOTOROLA	MC14076	7

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD														

DATE
DRAWN BJ
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD
TITLE 1061/71
FRONT. P.C.B ASSY.
DRAWING NUMBER 400294
SHEET 3 OF 6

2364

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M5	280015	QUAD LATCH	MOTOROLA	MC14076	—
M6	280015	" "	"	"	—
M7	280067	16WAY. KEYBOARD ENCODER	NATIONAL	MM74C922	2
M8	280015	QUAD LATCH	MOTOROLA	MC14076	—
M9	280015	QUAD LATCH	"	"	—
M10	280067	16 WAY. KEYBOARD ENCODER.	NATIONAL	MM74C922	—
M11	280015	QUAD LATCH	MOTOROLA	MC14076	—
M12	280015	" "	"	"	—
M13	290042	G.P. HIGH CURRENT. TRANS ARRAY	RCA	CA3081P	—
S1	700019	SLIDE SWITCH	SIEMENS	C-42315-A60-A1	2
S2	700019	" "	"	"	—
S3	700061	KEYBOARD SWITCH. RED. LED	SCHADOW	SRL-RED LED	24
S4	700061	" " " "	"	" " "	—
S5	700061	" " " "	"	" " "	—
S6	700061	" " " "	"	" " "	—
S7	700061	" " " "	"	" " "	—
S8	700061	" " " "	"	" " "	—
S9	700061	" " " "	"	" " "	—
S10	700062	KEYBOARD SWITCH. GREEN LED	SCHADOW	SRL - GREEN LED	2

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS													
E.C.O.													
DATE													
CHKD.													

DATE

DRAWN B.J

CHECKED

APPROVED

DATE

datron ELECTRONICS LTD

TITLE 1061/71 FRONT. P.C.B ASSY

DRAWING NUMBER 400294

SHEET 4 OF 6

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
S11	700061	KEYBOARD. SWITCH. RED. LED.	SCHADOW	SRL - RED LED	—
S12	700061	" " " "	"	" " "	—
S13	700061	" " " "	"	" " "	—
S14	700061	" " " "	"	" " "	—
S15	700061	" " " "	"	" " "	—
S16	700061	" " " "	"	" " "	—
S17	700061	" " " "	"	" " "	—
S18	700061	" " " "	"	" " "	—
S19	700061	" " " "	"	" " "	—
S20	700061	" " " "	"	" " "	—
S21	700061	" " " "	"	" " "	—
S22	700061	" " " "	"	" " "	—
S23	700061	" " " "	"	" " "	—
S24	700061	" " " "	"	" " "	—
S25	700061	" " " "	"	" " "	—
S26	700061	" " " "	"	" " "	—
S27	700061	" " " "	"	" " "	—
S28	700062	KEYBOARD SWITCH. GREEN. LED.	SCHADOW	SRL-GREEN LED	—

NOTES. .

SEE SHEET 2 FOR LATEST ISSUE

ISS													
E.C.O													
DATE													
CHKD													

DATE

DRAWN B.J

CHECKED

APPROVED

DATE

datron ELECTRONICS LTD

TITLE 1061/71 FRONT. P.C.B. ASSY

DRAWING NUMBER 400294

SHEET 5 OF 6

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	410090-4	PRINTED CIRCUIT BOARD			1
	450179-1	TERMINAL PLATE.			1
	605060	I.C. SOCKET 14 WAY	AUGAT	314-AG-39D	1
	605061	I.C. SOCKET 16 WAY	AUGAT	316-AG-39D	10
	605062	I.C. SOCKET 18 WAY	AUGAT	318-AG-39D	2
	540002	22 SWG TIN CU WIRE			A/R
	630024	INSULATING BEADS			8
	800017	8½ DIGIT DISPLAY	DALE		1
	920015	LOW. E.M.F. TERM. BLK/BLK	CLIFF	TPI - SPECIAL	1
	920041	" " " BLK/RED	CLIFF	" "	1
	920042	NOT LOW E.M.F. TERM BLK/WH	"	TPI	1
	920043	" " " " BLK/BRN	"	"	1
	920044	" " " " BLK/BLUE	"	"	1
	920045	" " " " BLK/YELLOW	"	"	1
	630029	DOUBLE SIDED PRESSURE SENSITIVE TAPE.	3M	TYPE 4032	4 x 25 mm
	420080-1	WARNING LABEL			1
	590004	SLEEVE - PTFE	HELLERMANN	FE10	45 mm
	613009	SOLDER TAG 48A TINNED BRASS	R.S.		2
	590032	HEATSHRINK ϕ4·8 YELLOW			A/R

NOTES

SEE SHEET [illegible] FOR LATEST ISSUE

AT	datron ELECTRONICS LTD	
DRAWN B.J.P.	TITLE 1061/71 FRONT P.C.B. ASSY.	
CHECKED		
APPROVED		
DATE	DRAWING NUMBER 400294	SHEET 6 OF 6

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
R1	000104	100K 5% 1/4W CARBON	MULLARD	CR25	1
R2	066200	20R POT 3/8 sq. VERT. CERMET.	BECKMAN	72XW	1
R3	000221	220R 5% 1/4W CARBON.	MULLARD	CR25	1
R4	014300	430R 1% M.F.	HOLCO	H.8	1
R5	000102	1K 5% 1/4W CARBON	MULLARD	CR25	2
R6	000184	180K 5% 1/4W CARBON	MULLARD	CR25	1
R7	066102	1K 3/8" RIGHT ANGLED CER. POT.	BECKMAN	72XW	1
R8	014021	4K02 1% 1/8W M.F.	HOLCO	H.8	1
R9	019101	9K1 1% 1/8W M.F.	HOLCO	H.8	1
R10	012001	2K 1% 1/8W M.F.	HOLCO	H.8.	1
R11	011302	13K 1% 1/8W M.F.	HOLCO	H.8.	1
R12	066501	500R 3/8" RIGHT ANGLED CER. POT.	BECKMAN	72XW	1
R13	000102	1K 5% 1/4W CARBON.	MULLARD	CR25	—
L1	370001	10μH 0·85Ω R.F. CHOKE	PLESSEY	50/10/0011/10	3
L2	370001	10μH " "	"	"	—
L3	370001	10μH " "	"	"	—
C1	110013	0·1μF 10% 250V POLYESTER	MULLARD	C280AE/P100K	1
C2	NOT USED				
C3	NOT USED				

NOTES CIRCUIT DIAG. 430295
CHECK PROC. 460295
CHECK LIST 470295.

SEE SHEET 7 FOR LATEST ISSUE

	C	D	1	2	3	4	5	6
ISS	-	-	RELEASED	ECO 783	ECO 816	882	900	891
ECO	-	-	22-8-78	29-9-78	18-12-78	25 JAN 79	6 JUN 79	31-10-79
DATE			NO	NO	NO	NO	NO	NO
CHKD								

2-5-78 datron
DRAWN B.J.
CHECKED M.H.
APPROVED
TITLE 1061 / 1071 - REAR P.C.B ASSY.
DRAWING NUMBER 400295 SHEET 2 OF 6

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
C4		NOT USED			
C5	101103	0·01μF 250V CER DISC	ERIE	801	4
C6	180026	10μF 350V ELECT	ITT	EN12/12 10/350	1
C7	180004	4700μF 16V AL ELECT	WIMA	PRINTILYT	1
C8	101103	0·01μF 250V CER. DISC	ERIE	801	—
C9	150003	47μF 20% 6V3 DIP. TANT	UNION CARBIDE	K47E6V3	1
C10	150021	22μF 20% 25V DIP. TANT	UNION CARBIDE	K22E25	2
C11	150021	" " " "	"	"	—
C12	101103	0·01μF 250V. CER. DISC.	ERIE	801	—
C13	180025	1000μF 35V ELECT.	WIMA	PRINTILYT	2
C14	101103	0·01μF 250V. CER DISC	ERIE	801	—
C15	180025	1000μF 35V ELECT	WIMA	PRINTILYT	—
C16	102102	1nF 10% 500V CER DISC	ITT	CD10	1
D1	200010	Si RECTIFIER 3A 100V	INTERNATIONAL RECT	3051	2
D2	200010	"			—
D3	210068	6V8 400mW ZENER	MULLARD	BZY88C6V8	1
D4	213004	180V 500mW ZENER	MOTOROLA	1N5279B	1

NOTES

SEE SHEET 7 FOR LATEST ISSUE

ISS	
ECO	
DATE	
CHKD	

2-5-78 datron
DRAWN B.J.
CHECKED M.H.
APPROVED
1061/71 REAR P.C.B ASSY.
DRAWING NUMBER 400295 SHEET 3 OF 6

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
Q1	240018	300V. N.P.N. TRANSISTOR	MOTOROLA	MJE 340	2
Q2	240018	" "	"	"	—
M1	260005	5V 1A. REGULATOR	MOTOROLA	MC7805CP	1
M2	260024	POSITIVE VOLTAGE REGULATOR	FAIRCHILD	μA 78 MGUIC	1
M3	260023	NEGATIVE VOLTAGE REGULATOR	FAIRCHILD	μA 79 MGUIC	1
W1	209014	1A5 400V BRIDGE RECT	MICRO ELECTRONICS	W004	1
W2	209004	100V 1A. BRIDGE RECT	GENERAL INSTRUMENT	W01	1
J1					
J2	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	5
J3	604032	4 WAY FLAT TIN WAFER PIN	MOLEX	22-27-2041 / TIN	11
J4	604032	" " " " "	"	"	—
J5	604033	" " GOLD " "	"	" /GOLD	6.

NOTES

SEE SHEET 2 FOR LATEST ISSUE

NO.														
ECO														
DATE														
SIGN														

DATE 2-5-78

DRAWN B.J.

CHECKED MRH

APPROVED

DATE

datron ELECTRONICS LTD

TITLE 1061/71 REAR P.C.B. ASSY.

DRAWING NUMBER 400295

SHEET 4 OF 6

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
J6	604032	4 WAY FLAT TIN WAFER PIN	MOLEX	22-27-2041 / TIN	—
J7	604032	" " " " "	"	"	—
J8					
J9	604032	4 WAY FLAT TIN WAFER PIN	MOLEX	22-27-2041 / TIN	—
J10	604032	" " " " "	"	"	—
J11	604033	4 WAY FLAT GOLD WAFER PIN	MOLEX	22-27-2041/GOLD	—
J12	604033	" " " " "	"	"	—
J13	604033	" " " " "	"	"	—
J14					
	410091-5	PRINTED CIRCUIT BOARD			1
	450180-1	HEATSINK 5V	ADVANCE		1
	450183-1	HEATSINK 15V	ADVANCE		3
	540002	22SWG TIN CU WIRE			A/R
					—
	611037	SCREW M3x8mm. NYLON HEX HD	NYLON ALLOYS		9
	613005	WASHER M3 INT/SHAKEPROOF ST.	GKN DISTRIBUTORS		4
	613017	WASHER M3 FLAT NYLON	NYLON ALLOYS		9
	615002	NUT M3 FULL HEX STEEL	GKN	ZINC PLATED	2
	615008	NUT M3 FULL HEX NYLON	GKN		3

NOTES

SEE SHEET 2 FOR LATEST ISSUE

NO.														
ECO														
DATE														
SIGN														

DATE 2-5-78

DRAWN B.J.

CHECKED MRH

APPROVED

DATE

datron ELECTRONICS LTD

TITLE 1061/71 REAR P.C.B. ASSY

DRAWING NUMBER 400295

SHEET 5 OF 6

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy
	611016	SCREW M3 x 8mm STEEL POZI PAN ZINC PL	GKN		4
	618007	MELINEX WASHERS 12·7 x 16·5 x 10·05mm	JERMYN	J26-5001	3
	590004	SLEEVE - PTFE	HELLERMANN ELECTRIC	FE 10	A/R.
	900004	SILICONE RUBBER COMPOUND	R.S.	554-119	A/R
	420080-1	WARNING LABEL			2

NOTES

2-5-78
B.J.

datron ELECTRONICS LTD
1061/71
REAR P.C.B ASSY
DRAWING NUMBER 400295 6 6

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
J2	572115 /C	16 WAY RIBBON CABLE ASSY	DATRON.		1
J3	604035	4CCT. RIGHT ANGLED WAFER. GOLD.	MOLEX.	22-12-2041.	5
J4	604035.	" " " "	"	"	—
J6	604035.	" " " "	"	"	—
	410092-5A	P.C.B.			1
	540002	22SWG TIN CU. WIRE			A/R
J1 & J5	604036	STRIP OF 10 AMP PINS	AMP	163740-8	4
	630023	SCOTCHFLEX ADHESIVE CLIP	3M	CLIP 706	1
	630099	25mm MASKING TAPE	3M	SCOTCH N.230	A/R.
R1	000473	47K 5% ¼W CARBON	MULLARD	CR25	2
R2	000473	47K " " "	"	"	—
D1	200002	Si RECTIFIER 1A 50V	FAIRCHILD	IN4001	2
D2	200002	" " " "	"	"	—

NOTES. CIRCUIT DIAGRAM . 430296
CHECK PROC. . 460296.
CHECK LIST. . 470296.
SEE SHEET 2 FOR LATEST ISSUE

	C	D	1	2	3	4	5	6	7	8
ECO	—	—	DELETED	ECO 784	ECO 849	967/504	992	1000	1102	1217
DATE	—	25-8-78	29-9-78	6-12-78	4-5-79	11-6-79	25-10-79	18.1.80	14.4.80	18-8-81
CHKD	—	MD		MD	MD	MD	MD	MD	MD	MD

DATE 2-5-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD
TITLE 1061/71 CENTRE P.C.B. ASSY
DRAWING NUMBER 400296
SHEET 2 OF 2

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
J2	604035	RIGHT ANGLED WAFER PIN. GOLD.	MOLEX	22-12-2041	12
J3	604035	" " " " "	"	"	—
J4	604035	" " " " "	"	"	—
J5	604035	" " " " "	"	"	—
J6	604035	" " " " "	"	"	—
	410093-4	PRINTED CIRCUIT BOARD			1
	510111	7/0·2 BROWN WIRE			120 mm
J1 & J7	604036	STRIP OF 10 AMP PINS	AMP	163740-8	2
	605053	12 WAY POLARISED SOCKET	MOLEX	22-01-2125	2
	605057	GOLD CRIMP PINS	MOLEX	4809-GL	7
	606004	PLASTIC POLARISING PEG	MOLEX	4161-1	4
	540002	22 S.W.G. TIN.CU.WIRE			A/R
	590001	SLEEVE MAX CABLE Ø3·0	HELLERMANN ELECTRIC	H15 x 20mm BLK HELSYN	1

NOTES. CIRCUIT DIAGRAM . 430297.
CHECK PROC. . 460297.
CHECK LIST . 470297.
SEE SHEET 2 FOR LATEST ISSUE

ISS	C	D	1	2
ECO	-	-	RELEASED	B67
DATE	-	24-8-78	29-9-78	11-6-79
CHKD	-	MD		MD

DATE	28-4-78
DRAWN	B.J.
CHECKED	DCJ
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE 1061/71
L.H. P.C.B ASSEMBLY

DRAWING NUMBER 400297

SHEET 2 OF 2

JW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
R1	000334	330K 5% ¼W CARBON	MULLARD	CR25	2
R2	000334	" " " "	"	"	-
	410094-4	P.C.B.			1
	540002	22SWG TIN. CU. WIRE.			A/R
J2	574270/C	24 WAY RIBBON CABLE ASSY	DATRON		1
J1 & J3	604036	STRIP OF 10AMP PINS	AMP	163740-8.	4
	590001	SLEEVE MAX CABLE Ø 3·0	HELLERMANN ELECTRIC	H15x20mm BLK. HELSYN	2
	630099	25mm MASKING TAPE.	3M	SCOTCH N.230	A/R

NOTES. CIRCUIT DIAGRAM - 430298
CHECK PROC. - 460298
CHECK LIST - 470298
SEE SHEET 2 FOR LATEST ISSUE

	C	D	1c	2	3	4	5
ECO	-	-	RELEASED	ECO 850	867/904	943	1217
DATE	-	24-8-78	29-9-78	4-5-79	11-6-79	10.9.79	18·8·81
CHKD	-	MD		MD	MD	MD	MD

DATE 28-4-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061/71. R.H. P.C.B. ASSEMBLY

DRAWING NUMBER 400298

SHEET 2 OF 2

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R1	000333	33K. 5%. ¼W CARBON	MULLARD	CR25	2
R2	000824	820K 5% ¼W CARBON	MULLARD	CR25	1
R3	000223	22K 5% ¼W CARBON	MULLARD	CR25	2
R4	000222	2K2 5% ¼W CARBON	MULLARD	CR25	3
R5	000104	100K 5% ¼W CARBON	MULLARD	CR25	3
R6	000104	100K 5% ¼W CARBON	MULLARD	CR25	–
R7	000104	100K 5% ¼W CARBON	MULLARD	CR25	–
R8	000102	1K 5% ¼W CARBON	MULLARD	CR25	2
R9	000105	1M 5% ¼W CARBON	MULLARD	CR25	3
R10	000105	1M 5% ¼W CARBON	MULLARD	CR25	–
R11	000105	1M 5% ¼W CARBON	MULLARD	CR25	–
R12	000103	10K 5% ¼W CARBON	MULLARD	CR25	5
R13	000103	10K 5% ¼W CARBON	MULLARD	CR25	–
R14	000103	10K 5% ¼W CARBON	MULLARD	CR25	–
R15	000222	2K2 5% ¼W CARBON	MULLARD	CR25	–
R16	000223	22K 5% ¼W CARBON	MULLARD	CR25	–
R17	000103	10K 5% ¼W CARBON	MULLARD	CR25	–
R18	015112	51K1 1% ⅛W M.F	WELWYN	4033C	1
R19	070123	900R 0·1% 5 ppm/°C W.W.	MANN (KELVIN)	MX 125-B (EP-01)	1
R20	070124	90R 0·1% 5 ppm/°C W.W.	MANN	MX 125-B	1
R21	070125	9R 0·1% 5 ppm/°C W.W.	MANN	AX 175 BT	1
R22	070126	1R 0·1% 5 ppm/°C W.W.	MANN	LR500BU	1
R23	000222	2K2 5% ¼W CARBON	MULLARD	CR25	–

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS	A	B	C	1e	2	3	4	5	6	7	8
				9 1217 18.8.81 MD							
DATE	17 JULY 79	21 AUG 79	24.9.79	24.9.79	972,987 25-10-79	4-1-80	1048 16.1.80	1087.1099. 1110 14.4.80	1116 3.6.80	1189 17.12.80	1080 26.2.81
DRWN	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD

DATE 17 JULY 79
DRAWN W.G. SMITH
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE CURRENT P.C.B

DRAWING NUMBER 400304 SHEET 2 OF 7

DESIGNATOR		DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R24		000102	1K 5% ¼W CARBON	MULLARD	CR25	–
R25		070127	0R1 0.1% 5ppm/°C W.W.	MANN	LR500BU	1
R26		000333	33K 5% ¼W CARBON	MULLARD	CR25	–
R27	●	000331	330R 5% ¼W CARBON	MULLARD	CR25	2
R28	●	000331	330R 5% ¼W CARBON	MULLARD	CR25	–
R29		000103	10k 5% ¼W CARBON	MULLARD	CR25	–
C1		150020	10µF 25V TANT	UNION CARBIDE	K10E25	2
C2		150020	10µF 25V TANT	UNION CARBIDE	K10E25	–
C3		101103	10nf 250V CER DISC	ERIE	801	1
C4		150014	680nf 35V 20% TANT	UNION CARBIDE	KRGBE35	1
C5		150016	1µf 35V TANT	UNION CARBIDE	K1R0E35	2
C6		150016	1µf 35V TANT	UNION CARBIDE	K1R0E35	–
C7	*	102471	470pF 10% 500V CER DISC	ITT	CD10	1
	+	102331	330pF 10% 500V CER DISC	ITT	CD10	
C8		102101	100pF 10% 500V CER DISC	ITT	CD10	1
C9		110013	100nF 20% POLYESTER	MULLARD	C280AEP100K	1

NOTES. * VALUE CORRECT IF R19 MANUFACTURED BY MANN - TYPE MX125-B
+ VALUE CORRECT IF R19 MANUFACTURED BY KELVIN - TYPE EP-01
● R27 + 28 NOT USED WITH RL1, RL2 ALTERNATIVE

SEE SHEET 2 FOR LATEST ISSUE

ISS
E.C.O.
DATE
MKD

DATE 17 JULY 79
DRAWN W.G. SMITH
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE CURRENT P.C.B.

DRAWING NUMBER 400304 SHEET 3 OF 7

W 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D1	200001	75mA. 75v. G.P. Si DIODE.	FAIRCHILD.	IN4148.	5
D2	200008	200mA. 125v. L.L. Si DIODE.	FAIRCHILD.	IN458A.	3
D3	200008	200mA. 125V. L.L. Si DIODE.	FAIRCHILD.	IN458A.	–
D4	200008	200mA. 125V. L.L. Si DIODE.	FAIRCHILD.	IN458A.	–
D5	200001	75mA. 75v. G.P. Si DIODE.	FAIRCHILD.	IN4148	–
D6	200001	75mA. 75v. G.P. Si DIODE.	FAIRCHILD.	IN4148	–
D7	200001	75mA. 75V. G.P. Si DIODE.	FAIRCHILD.	IN4148	–
D8	200001	75mA. 75V. G.P. Si DIODE.	FAIRCHILD.	IN4148	–
D9		NOT USED			
D10		NOT USED			
D11	220020	FET DIODE 100pA I_R.	TELEDYNE.	PAD100	2
D12	220020	FET DIODE 100pA I_R.	TELEDYNE.	PAD100	–
D13	200010	3A. 100V. G.P. Si DIODE.	I.R.	3051	4
D14	200010	3A. 100V. G.P. Si DIODE.	I.R.	3051	–
D15	200010	3A. 100V. G.P. Si DIODE.	I.R.	3051	–
D16	200010	3A. 100V. G.P. Si DIODE.	I.R.	3051	–

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS	
E.C.O.	
DATE	
CHKD	

DATE	17 JULY 79
DRAWN	W.G. SMITH
CHECKED	
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE CURRENT P.C.B

DRAWING NUMBER 400304

SHEET 4 OF 7

JW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
Q1		NOT USED			
Q2	250001	Si P.N.P. TRANSISTOR.	NATIONAL.	BC214/TO18	2
Q3		NOT USED			
Q4	250001	Si P.N.P. TRANSISTOR.	NATIONAL.	BC214/TO18	–
Q5		NOT USED			
Q6		NOT USED			
Q7	230003	N-CHAN J FET.	TELEDYNE.	U1899 JF	1
Q8	230035	N-CHAN J FET.	TELEDYNE.	U1897 JF	2
Q9	230002	N-CHAN J FET.	TELEDYNE.	U1994 JF	1
Q10	230035	N-CHAN J FET.	TELEDYNE.	U1897 JF	–
M1	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076 BCP	2
M2	280011	DUAL D FLIP FLOP	MOTOROLA	MC14013 BCP	1
M3	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076 BCP	–
M4	270059	7 × DARLINGTON DRIVER	SPRAGUE/EXAR	ULN2004A/XR2204CP	1
M5	260027	714 OP AMP	FAIRCHILD	uA 714 HC.	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS	
E.C.O.	
DATE	
CHKD	

DATE	17 JULY 79
DRAWN	W.G. SMITH
CHECKED	
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE CURRENT P.C.B

DRAWING NUMBER 400304

SHEET 5 OF 7

JW 1164

DESIGNATOR		DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
ANI			NOT USED			
RL1	*	330017	RELAY REED LOW THERMAL.	OMRON	G2E 182PH	2
RL2	*	330017	RELAY REED LOW THERMAL.	OMRON	G2E 182PH	-
RL3	(II)	330001	RELAY 4P2W CROSSBAR	P&B	RIO-EI-L4-Q2-5K	1
RL4	(I)	330003	RELAY 2P2W CROSSBAR	P&B	RIO-EI-L2-QS-BK(25207)	1
		400379/1	MOLEX TERMINAL/WIRE ASSY	DATRON		1
		410104-5	PRINTED CIRCUIT BOARD			1
		459112	RELAY BRACKET			2
		540008	7/·2 PTFE INSULATED WHITE WIRE		TYPEC	807mm TOTAL
		540002	22SWG TINNED COPPER WIRE			A/R
		590001	SLEEVE BLACK	HELLERMAN ELECTRIC	H16x20mm HELYSYN	16
		605056	CRIMP TERMINAL	MOLEX	4809-TL	3
JI		571095/C	16 WAY AP/3M RIBBON CABLE	DATRON		1
		605060	14 WAY D.I.L. SOCKET	ASTRALUX OR JERMYN	ICL-143-S3T	1
		605061	16 WAY D.I.L. SOCKET	ASTRALUX OR JERMYN	ICL-163-S6T	3
		605051	4 WAY POLARISED SOCKET	MOLEX	(22-01-2045) 6471-4-1	1
J3		605052	8 WAY POLARISED SOCKET	MOLEX	(22-01-2085) 6471-8-1	1
J2		605053	12 WAY POLARISED SOCKET	MOLEX	(22-0-2125) 6471-12-1	1
		605057	CRIMP TERMINAL	MOLEX	4809-GL	8

NOTES * ALTERNATIVE 330014 OR 330013
(I) ALTERNATIVE 330015 } USE M2·3 FULL HEX. NUT-615014 . 2 OFF
(II) ALTERNATIVE 330016 } (CHALLENGE IND. FASTENERS)

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
E.C.O.																			
DATE																			
CHK'D.																			

DATE 17 JULY 79
DRAWN W.G.SMITH
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD
TITLE CURRENT P.C.B.
DRAWING NUMBER 400304
SHEET 6 OF 7

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
	611004	SCREW M3x6 POSI PAN			2
	613005	WASHER M3 INT/SHAKEPROOF			2
	615002	NUT M3 FULL HEX			2
	615005	NUT 3-48 UNC FULL HEX			2
	613014	WASHER M2·5 INT SHAKEPROOF			2
	617010	NYLATCH PLUNGER	C.J. FOX & SON	HN3P-32-4-1	4
	617011	NYLATCH GROMMET	C.J. FOX & SON	HN3G	4.
	620003	SOLDER P.C.B TERMINAL LUG	HARWIN	H2105A	13
	630024	STANDARD STEATITE INSUL. BEAD	PARK ROYAL PORCELAIN CO.	TYPE Nº 2 (16SWG.)	24
	920082	FUSE HOLDER. 20mm P/MTG	BELLING & LEE	L2002	1
	920071	FUSE 1·6A QUICK ACTING 20mm	BESWICK	3501-1·6-F-250V	1
	590004	SLEEVE - PTFE	HELLERMANN ELECTRIC	FE10	A/R
	590055	SLEEVE Ø1·0 SIL. RUBBER	" "	H15 CONT. BLACK	30mm

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
E.C.O.																			
DATE																			
CHK'D.																			

DATE 17 JULY 79
DRAWN W.G.SMITH
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD
TITLE CURRENT P.C.B.
DRAWING NUMBER 400304
SHEET 7 OF 7

JW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
R1	000104	100K. 5%. ¼W CARBON.	MULLARD	CR25	6
R2	000104	100K. " " "	"	"	—
R3	000104	100K " " "	"	"	—
R4	000104	100K " " "	"	"	—
R5	000103	10K " " "	"	"	2
R6	000104	100K " " "	"	"	—
R7	000104	100K " " "	"	"	—
R8	000103	10K " " "	"	"	—
AN1	090017	100K ×7. 2%. NETWORK.	BECKMAN	764-1-R100K	3.
AN2	090017	100K ×7. " "	"	"	—
AN3	090017	100K ×7. " "	"	"	—

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS	A	1	2	3	4	5	6
—	—	—	1008	1000,1052	1178	1198	1217
DATE	25.4.79	18 MAY 79	26 OCT 79	18.1.80	14.10.80	24.2.81	18.8.81
CHKD			MD	MD	MD	MD	MD

25 APRIL 79 — datron ELECTRONICS LTD

DRAWN W.G.SMITH. — TITLE I.E.E.E 488 OPTION.

CHECKED G.C.M

APPROVED

DATE 18 MAY 79 — DRAWING NUMBER 400306 — SHEET 2 OF 5

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
C1	150012	100nf 20% 35V DIP TANT	UNION CARBIDE	KR10E35	1
C2	150016	1uF 20% 35V DIP TANT	" "	KR20E16	1
C3	101103	10nf 25% 250V CER DISC	I.T.T.	CD10	1
C4	150015	10uF 20% 35V DIP TANT	UNION CARBIDE	K10E35	4
C5	150015	10uF 20% 35V DIP TANT	" "	K10E35	—
C6	150015	10uF 20% 35V DIP TANT	" "	K10E35	—
C7	150015	10uF 20% 35V DIP TANT	" "	K10E35	—
M1	270049	QUAD BUS TRANSCEIVER	MOTOROLA	MC3446	4
M2	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503 BCP	7
M3	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503 BCP	—
M4		TO BE FITTED AT FINAL ASSY STAGE			—
M5	270049	QUAD BUS TRANSCEIVER	MOTOROLA	MC3446	—
M6	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503 BCP	—
M7	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503 BCP	—
M8	270049	QUAD BUS TRANSCEIVER	"	MC3446	—
M9	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503 BCP	—
M10	280064	I.E.E.E 488 INTERFACE CHIP	"	MC68488P	1
M11	270049	QUAD BUS TRANSCEIVER	"	MC3446	—
M12	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503 BCP	—

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS												
DATE												
CHKD												

DATE 25 APRIL 79 — datron ELECTRONICS LTD

DRAWN W.G.SMITH — TITLE I.E.E.E 488 OPTION

CHECKED G.C.M

APPROVED

DATE 18 MAY 79 — DRAWING NUMBER 400306 — SHEET 3 OF 5

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
M13	280024	TRI-STATE HEX NON-INV BUFFER	MOTOROLA	MC14503 BCP	—
M14	270050	HEX INVERTER	FAIRCHILD	F74LS04	1
M15	270053	DUAL 4 INPUT NAND	"	74LS20	2
M16	280066	256×4 BIT STATIC CMOS RAM	SEE DRAWING		2.
M17	280068	DUAL MONOSTABLE MULTIVIBRATOR	MOTOROLA	MC14538 BCP	1
M18	270055	DUAL 4 INPUT NAND	FAIRCHILD	74LS20	—
M19	270051	DUAL 4 INPUT AND	"	74LS21	1
M20	280066	256×4 BIT STATIC CMOS RAM	SEE DRAWING		—

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS	ECO	DATE	CHKD

DATE 25 APRIL 79.

DRAWN W.G.SMITH

CHECKED G.C.M

APPROVED

DATE 18 MAY 79

datron ELECTRONICS LTD

TITLE I.E.E.E. 488 OPTION.

DRAWING NUMBER 400306

SHEET 4 OF 5

A 214

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
	400379/1	WIRE/TERMINAL ASSY			2
	410101-4	PRINTED CIRCUIT BOARD			1
	573120/C	24 WAY AP/3M RIBBON CABLE	DATRON		1
	540002	22 SWG TINNED COPPER WIRE			A/R
	590004	SLEEVE — PTFE	HELLERMANN ELECTRIC	FE10	A/R
J2	605002	16 WAY LOW PROFILE SOCKET	JERMYN/ANTIFERENCE	A23-2001/Y OR ICN 163-53G	1
	605060	14 WAY D.I.L. SOCKET	ASTRALUX	I.C.L-143-53T	4.
	605061	16 WAY D.I.L SOCKET	"	I.C.L-163-56T	12.
	605050	40 WAY D.I.L. SOCKET. LOW PROFILE.	AUGAT	340-AG39D	1
J4	605051	4 WAY POLARISED SOCKET	MOLEX	(22-01-2045) 6471-4-1	1
	605063	22 WAY D.I.L. SOCKET	AUGAT	322-AG39D	2.
J1	605064	24 WAY D.I.L. SOCKET	"	324-AG39D	1
	605056	CRIMP TERMINAL	MOLEX	4809 TL	2
	606005	SOCKET CLIP	ANTIFERENCE	RC-74	1
	617010	NYLATCH PLUNGER HN3P	RICHO	HN3P-32-4-1	6
	617011	NYLATCH GROMMET HN3G	"	HN3G-32-1	6
	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS	ECO	DATE	CHKD

DATE 25 APRIL 79.

DRAWN W.G.SMITH

CHECKED G.C.M

APPROVED

DATE 18 MAY 79.

datron ELECTRONICS LTD

TITLE I.E.E.E. 488 OPTION.

DRAWING NUMBER 400306

SHEET 5 OF 5

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	000123	12K 5% 1/4W CARBON	MULLARD	CR25	3
R2	000332	3K3 " " "	"	"	6
R3	000332	3K3 " " "	"	"	-
R4	000183	18K " " "	"	"	2
R5	000123	12K " " "	"	"	-
R6	000222	2K2 " " "	"	"	2
R7	000222	2K2 " " "	"	"	-
R8	000123	12K " " "	"	"	-
R9	000333	33K " " "	"	"	1
R10	000562	5K6 " " "	"	"	1
R11	000183	18K " " "	"	"	-
R12	000105	1M " " "	"	"	1
R13	000332	3k3 " " "	"	"	-
R14	000103	10k " " "	"	"	2
R15	000332	3k3 " " "	"	"	-
R16	000332	3k3 " " "	"	"	-
R17	000681	680R " " "	"	"	2
R18	000681	680R " " "	"	"	-
R19	000332	3k3 " " "	"	"	-
R20	000103	10k " " "	"	"	-

NOTES

SEE SHEET 3 FOR LATEST ISSUE

ISS	1	2	3	4	5	6	7	8
	RELEASED	902/887	972	981	1021 1053	1085	1166	1199
DATE	26-3-79	15-6-79	25-10-79	6-11-79	2-1-80	22.4.80	24.9.80	24.2.81
CHKD	MD	MD	MD	MD	MD	MD	MD	MD

DATE 5-3-79
DRAWN B.J.
CHECKED MD
APPROVED
DATE

datron ELECTRONICS LTD

TITLE REAR INPUT / RATIO ASSY.

DRAWING NUMBER 400307.

SHEET 3 OF 8

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
C1	150022	2µ2F 20% 35V DIP. TANT	UNION CARBIDE	K2R2E35	2
C2	150022	2µ2F 20% 35v DIP. TANT	UNION CARBIDE	K2R2E35	-
C3	150007	6µ8F 20% 16v DIP. TANT	UNION CARBIDE	K6R8E16	2
C4	150007	6µ8F 20% 16V DIP. TANT	UNION CARBIDE	K6R8E16	-
C5	102101	100pF 10% 500V CER DISC	ITT	CD10	1
C6	110013	100nF 20% 250v POLYESTER	MULLARD	C280AEP100K	1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD														

DATE 23.9.80
DRAWN IL
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE REAR INPUT/RATIO 1061/1071

DRAWING NUMBER 400307

SHEET 4 OF 8

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D1	200001	75mA 75V GP. Si DIODE	FAIRCHILD	IN4148.	8
D2	200001	" " " " "	"	"	–
D3	200001	" " " " "	"	"	–
D4	200001	" " " " "	"	"	–
D5	200001	" " " " "	"	"	–
D6	200001	" " " " "	"	"	–
D7	200001	" " " " "	"	"	–
D8	200001	" " " " "	"	"	–
Q1	240001	Si NPN TRANSISTOR	NATIONAL	BC184/TO18	4
Q2	240001	" " "	"	"	–
Q3	250001	Si PNP TRANSISTOR	NATIONAL	BC214/TO18	2
Q4	250001	" " "	"	"	–
Q5	240001	Si NPN TRANSISTOR	NATIONAL	BC184/TO18	–
Q6	240001	" " "	"	"	–
M1	280011	DUAL D FLIP-FLOP	MOTOROLA	MC14013BCP	1
J1	604036	CON. PIN. STRIP OF 10. HORIZ. TYPE.	AMP	163740-8	2
J2, J3	605052	8 WAY POLARISED SOCKET.	MOLEX	(22-01-2085) 6471-8-1	2

NOTES

SEE SHEET 8 FOR LATEST ISSUE

ISS	A
DATE	5-3-79
DRAWN	B.J.
CHECKED	MD
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: REAR INPUT / RATIO ASSY.

DRAWING NUMBER: 400307

SHEET 5 OF 8

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy
J4 & J6.	604033	FLAT WAFER PIN (4WAY GOLD)	MOLEX	22-27-2041 / GOLD	3
J5	605051	4 WAY POLARISED SOCKET	MOLEX	22-01-2045	1
	400379/4	WIRE/TERMINAL ASSY.	HOLDEN CORDS		6
	400379/5	" " "	" "		4
RL1 & RL4.	(1) 330003	RELAY 2P2W CROSSBAR	P&B	RIO-E1-L2-Q5-BK(Z5207).	2
RL2 & RL3.	(11) 330001	RELAY 4P2W CROSSBAR	P&B	RIO-E1-L4-Q2-5K.	2
	410106-5	COMPONENT PCB.			1
	410132-4	RELAY PCB.			1
	450185-1	SOCKET PLATE			1
	450241-1	RELAY BRACKET			1
	540002	22SWG TINNED COPPER WIRE			A/R
	540008	7/2 PTFE INS. WHITE WIRE			140mm

NOTES.
(1) ALTERNATIVE RELAY 330015 (OMRON.)
(11) ALTERNATIVE RELAY 330016 (OMRON)
USE M2·3 FULL HEX. NUT-615014 (CHALLENGE IND. FASTENERS) 4OFF.

SEE SHEET 8 FOR LATEST ISSUE

ISS	
ECO	
DATE	
CHKD	

DATE	5-3-79
DRAWN	B.J.
CHECKED	MD
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: REAR INPUT / RATIO ASSY

DRAWING NUMBER: 400307

SHEET 6 OF 8

JW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
	590001	SLEEVE MAXCABLE ϕ 3·0mm	HELLERMANN ELECTRIC.	H15X20mm BLK HELSYN	23
	590004.	SLEEVE - PTFE	" "	FE10	A/R
	602007	RELAY SOCKET 2POLE PCB MOUNT	POTTER & BRUMFIELD	27E212	1
	602009	RELAY SOCKET 4POLE PCB MOUNT	" "	27E213	1
J10, J11	604008	7 WAY PLUG PANEL MOUNT	PYE CONNECTORS	M7P	2
	605009	7 WAY SOCKET	PYE CONNECTOR	M7S	2
	605060	14 WAY DIL SOCKET	ASTRALUX OR JERMYN	ICN-246-SAT OR A23-2023Y	1
	605057	CRIMP TERMINAL	MOLEX	4808-GL	2
	606001	LOCKING HOOD	PYE CONNECTORS.	MHN	2
	606002	NUT	PYE CONNECTORS.	MN	2
	606003	WASHER	" "	MLW	2
	611004	SCREW M3X6mm STEEL POZI-PAN. ZINC PLATED . GKN.			7
	611007	SCREW M3X6mm STEEL POZI-CSK. ZINC PLATED . GKN.			7
	611016	" M3X8mm " " PAN " " "			4
	612020	STANDOFF NYLON M3X19 TRANSIPILLAR. W.K. ELECTRONICS		TPI/G·5/19/M3/I/I	5

NOTES

SEE SHEET 3 FOR LATEST ISSUE

ISS																			
E.C.O.																			
DATE																			
CHKD																			

DATE	5-3-79
DRAWN	B.N.
CHECKED	M.D.
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: REAR INPUT / RATIO ASSY

DRAWING NUMBER 400307 SHEET 7 OF 8

W 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
	613005	WASHER M3 INT/SHAKEPROOF ST.	GKN DISTRIBUTORS	ZINC PLATED	13
	615001	NUT BBA FULL HEX STEEL		ZINC PLATED	2
	615002	" M3 " " "		" "	2
	630005	CLIP FOR P&B RIO 2POLE RELAY	POTTER & BRUMFIELD	20C249	1
	630028	CLIP FOR P&B RIO4POLE RELAY	" "	20C250	1
	700069.	DPDT SLIDE SWITCH	WAYCOM	S-5022CD03-0 + 3/4" TRIGGER & STYLE 2/C PCB MOUNT, CONTACTS.	1

NOTES

SEE SHEET 3 FOR LATEST ISSUE

ISS																			
E.C.O.																			
DATE																			
CHKD																			

DATE	5-3-79
DRAWN	B.N.
CHECKED	M.D.
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: REAR INPUT / RATIO ASSY

DRAWING NUMBER 400307 SHEET 8 OF 8

W 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy	
R1	000102	1KΩ 5% ¼W CARBON	MULLARD	CR25	1	
R2	000682	6K8 " " "	"	"	1	
R3	090001	PTC THERMISTOR	MULLARD	VA8650	2	
R4	090001	" "	"	"	–	
R5	066102	1KΩ 3/8" SQ VERTICAL POT	BECKMAN	72XW	1	
R6	000104	100K 5% ¼W CARBON	MULLARD	CR25	1	
R7	070128	21K51 0·1% WIRE WOUND	MANN	MX 125	1	
R8	070066	10K 0·1% WIRE WOUND	MANN	MX 125	1	
C1	101103	0·01μF 250V CER DISC	ITT	CD10K3IN00JS S35003C	2	
C2	101103	0·01μF " " "	"	"	–	
C3 *	102330	33pF 500V CER DISC	ITT	CD10PG33P0JS S35003C	1	*
C4	102330	33pF " " "	"	"	1	
C5	110013	0·1μF 20% 250V POLYESTER	MULLARD	C280AE/P100K	1	

NOTES. * ONLY REQUIRED WHEN M1 ALTERNATIVE (TYPE 101) IS USED.
CCT DIAG. 430308
CHECK PROC 480308. CHECK LIST 470308
SEE SHEET 2 FOR LATEST ISSUE

ISS	1	2	3
ECO	Bullard	907	945
DATE	27.12.78	20.6.79	10.9.79
CHKD	MD	MD	BJ

DATE 22-11-78
DRAWN B.J.
CHECKED MD
APPROVED
DATE

datron ELECTRONICS LTD
TITLE ANALOGUE OUTPUT PCB ASSY.
DRAWING NUMBER 400308
SHEET 2 OF 4

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy	
D1	213001	10V 5W ZENER	MOTOROLA	IN5347	2	
D2	213001	10V " "	"	"	–	
M1 *	260002	OP AMP	FAIRCHILD	μA741C	1	*
M2	260026	OP AMP	NATIONAL	LM212H	1	
	400379/4	WIRE / TERMINAL ASSY	HOLDEN CORDS.		5	
	410107-3	P.C.B.			1	
	450186-1	SOCKET PLATE.			1	
	510000	7/·2 PVC INSUL (BLACK) WIRE			50mm	
	510222	7/·2 PVC INSUL (RED) WIRE			50mm	
	540002	22 SWG TINNED CU WIRE			A/R	
	590001	SLEEVE MAX CABLE ϕ 3·0	HELLERMANN ELECTRIC	H15x20mm BLACK HELSM	2	
	605007	5 WAY SOCKET	PVE CONNECTORS	M55	1	
J1	605052	8 WAY POLARISED SOCKET	MOLEX	(22-01-2085) 6471-8-1	1	

NOTES. # M1 ALTERNATIVE 260025 (LM101).

SEE SHEET 2 FOR LATEST ISSUE

ISS	
ECO	
DATE	
CHKD	

DATE 22-11-78
DRAWN B.J.

datron ELECTRONICS LTD
ANALOGUE OUTPUT PCB ASSY.
DRAWING NUMBER 400308
SHEET 3 OF 4

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	606001	LOCKING HOOD	PYE CONNECTORS	MHN	1
	606002	NUT	" "	MN	1
	606003	WASHER	" "	MLW	1
	612019	STANDOFF LOCKING TYPE 7/8" NYLON: RICHCO		LCBS-14R	4
	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	2
	630024	INSULATING BEADS. STEATITE.		(TYPE N°2)	8.
*	604006	5 WAY PLUG	PYE CONNECTORS.	MSP.	1.
*	611016	SCREW POSI-PAN M3x8			4
*	613005	SHAKEPROOF WASHER M3			4

NOTES * FITTED AT FINAL ASSEMBLY.

SEE SHEET 2 FOR LATEST ISSUE

ISS										
ECO										
DATE										
CHKD										

DATE 28-11-78	datron ELECTRONICS LTD
DRAWN B.V.	TITLE ANALOGUE OUTPUT PCB ASSY.
CHECKED	
APPROVED	
DATE	DRAWING NUMBER 400308 — SHEET 4 OF 4

JW 1184

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	000104	100K 5% ¼W CARBON	MULLARD	CR25	13
R2	000101	100R " " "	"	"	4
R3	000101	100R " " "	"	"	-
R4	000105	1M 10% " "	"	"	11
R5	000822	8K2 " " "	MULLARD	CR25	3
R6	011302	13K0 1% 50ppm MF	HOLCO	HBC	2
R7	011302	13K0 " " "	"	"	-
R8	000101	100R 5% ¼W CARBON	MULLARD	CR25	-
R9		NOT USED			
R10	000101	100R 5% ¼W CARBON	"	"	-
R11		FSV		CR25	-
R12	000472	4k7 " " "	"	"	11
R13	000104	100k " " "	"	"	-
R14	000472	4k7 " " "	"	"	-
R15		FSV		CR25	-
R16	050038	6K34 1% 15ppm MF	ACI	EE-0-100-C4	2
R17	050037	4K75 1% 15ppm MF	ACI	EE-0-100-C4	2
R18		PART OF KIT WITH D59			
R19		PART OF KIT WITH D60			
R20	063203	20K POT CERMET	BECKMAN	72P	1
R21	000104	100K 5% ¼W CARBON	MULLARD	CR25	-
R22	000102	1K " " "	"	"	4
R23	063205	2M POT CERMET	BECKMAN	72P	2

NOTES. CIRCUIT DIAGRAM = 480328
CHECK PROCEDURE = 460328
CHECK LIST = 470328

SEE SHEET 2 FOR LATEST ISSUE

	10	11	12	13	14	15	16
ISS							
E.C.O	1000			1098. 1107	1128. 1050. 1117	1144. 1168	1114. 1182. 1184. 1188. 1191. 1190. 1193. 1192
DATE	29-10-79	18.1.80	27.2.80	15.4.80	2.6.80	23.9.80	5.1.81.
CHKD	MD	MD	MD	MD	MD	MD	MD

DATE 12-7-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSEMBLY.

DRAWING NUMBER 400328 | SHEET 2 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R24	000820	820K 5% ¼W CARBON	MULLARD	CR25	3
R25	000122	1K2 5% ¼W CARBON	MULLARD	CR25	1
R26	000225	2M2 10% ¼W CARBON	"	"	3
R27	000824	820K 5% ¼W CARBON	"	"	-
R28	000222	2K2 5% ¼W CARBON	"	"	7
R29	000100	10R " " "	"	"	8
R30	000100	10R " " "	"	"	-
R31	000473	47K " " "	"	"	3
R32	000393	39K " " "	"	"	1
R33	000473	47K " " "	"	"	-
R34	000102	1K " " "	"	"	-
R35	000104	100k " " "	"	"	-
R36	000104	100k " " "	"	"	-
R37	000562	5K6 " " "	"	"	3
R38	050034	825R 1% 15ppm MF	ACI	EE0-100 C4	2
R39	050035	40R2 1% 15ppm MF	"	EE0-100 C4	2
R40	050035	40R2 1% 5ppm	"	"	-
R41		NOT USED			-
R42	050031	196R 1% 15ppm MF	ACI	EE 0-100 C4	2
R43	019768	97R6 1% 50ppm MF	HOLCO	HBC	2
R44		NOT USED			
R45		NOT USED			
R46	000182	1K8 5% ¼W CARBON	MULLARD	CR25	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS														
E.C.O														
DATE														
CHKD														

DATE 12-7-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSEMBLY

DRAWING NUMBER 400328 | SHEET 3 OF 24

J.W 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R47	000100	10R 5% 1/4W CARBON	MULLARD	CR25	-
R48	000103	10K " " "	"	"	11
R49	000103	10K " " "	"	"	-
R50	000103	10K " " "			-
R51	000100	10R " " "			-
R52	000334	330K " "			4
R53	000334	330K " " "			-
R54	000334	330K " "			-
R55	000334	330K " "			-
R56	000104	100K " "			-
R57	000221	220R " "			3
R58	000821	820R " "			1
R59	000563	56K " "			6
R60	000222	2K2 " "			-
R61	000105	1M0 10% 1/4W CARBON			-
R62	000105	1M0 " "		"	-
R63	000221	220R 5% 1/4W CARBON		"	-
R64		NOT USED			
R65	000102	1K 5% 1/4W CARBON		"	-
R66	000183	18K " "		"	1
R67	000562	5K6 " "		"	-
R68	018060	806R 1% 50ppm MF	HOLCO	H8	2
R69	000114	110K 5% 1/4W CARBON	MULLARD	CR25	2

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS														
E.C.O														
DATE														
CHKD														

DATE 12-7-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSEMBLY.

DRAWING NUMBER 400328

SHEET 4 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R70	018060	806R 1% 50ppm MF	HOLCO	H8	-
R71	070115	12K0 1% 10ppm WW	MANN	MX125	2
R72	000472	4K7 5% 1/4W CARBON	MULLARD	CR25	-
R73	000103	10K " " "	"	"	-
R74	000275	2M7 " " "		"	2
R75	000565	5M6 " " "	"	"	1
R76	000106	10M 10% 1/4W CARBON	"	"	3
R77	000226	22M " " "	ALLEN BRADLEY	CB2261	1
R78	000473	47K 5% 1/4W CARBON	MULLARD	CR25	-
R79	000392	3K9 " " "	"	"	2
R80	000104	100K " " "	"	"	-
R81	000472	4K7 " " "	"	"	-
R82	000472	4K7 " " "	"	"	-
R83	000472	4K7 " " "	"	"	-
R84	011378	13R7 1% 1/8W MF	HOLCO	H8	1
R85		NOT USED			
R86	000472	4K7 5% 1/4W CARBON	MULLARD	CR25	-
R87	000114	110K " " "	"	"	-
R88		NOT USED			-
R89	050031	196R 1% ppm MF	ACI	EE 0·100-C4	-
R90	019768	97R6 1% 50ppm MF	HOLCO	H8C	-
R91		NOT USED			
R92		NOT USED			

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS														
E.C.O														
DATE														
CHKD														

DATE 12-7-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSEMBLY.

DRAWING NUMBER 400328

SHEET 5 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R93	000124	120K 5% 1/4W CARBON	MULLARD	CR25	2
R94	000102	1K " " "	"	"	–
R95	000106	10M 10% " "	"	"	–
R96	011473	147K 1% 50ppm MF	HOLCO	H8	1
R97		NOT USED			–
R98		NOT USED			–
R99	000472	4K7 5% 1/4W CARBON	MULLARD	CR25	–
R100	000472	4K7 " " "	"	"	–
R101	000100	10R 5% 1/4W CARBON	MULLARD	CR25	–
R102	000100	10R " " "	"	"	–
R103	000271	270R " " "	"	"	4
R104	000151	150R " " "	"	"	1
R105	000271	270R " " "	"	"	–
R106	000222	2k2 " " "	"	"	–
R107	000222	2k2 " " "	"	"	–
R108	090038	10K811 ATTEN SET	MANN		1 SET
R109	090038	10K811 "	"		–
R110	090038	9K "	"		–
R111	090038	1K "	"		–
R112	000682	6K8 5% 1/4W CARBON	MULLARD	CR25	1
R113	000105	1MO 10% 1/4W CARBON	"	"	–
R114	042214	2M211% 100ppm CERMET FILM	ALLEN BRADLEY	TYPE CC	1
R115	041004	1M 1% 100ppm CERMET FILM	"	"	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

DATE	12-7-78	datron ELECTRONICS LTD	
DRAWN	B.J.	TITLE	1061 ANALOGUE PCB ASSEMBLY.
CHECKED		DRAWING NUMBER	400328
APPROVED		SHEET	6 OF 24
DATE			

ISS	ECO	DATE	CHKD

JW 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R116	000105	1M 5% 1/4W CARBON	MULLARD	CR25	–
R117	000105	1M " " "	"	"	–
R118	000105	1M " " "	"	"	–
R119	008012	27K 2W CARBON FILM	PIHER	"	2
R120	008012	27K " " "	"	"	–
R121	008011	22K " " "	"	"	2
R122	008011	22K " " "	"	"	–
R123	000225	2M2 5% 1/4W CARBON	MULLARD	CR25	–
R124	011213	121K 1% 50ppm MF	HOLCO	H8	2
R125	000225	2M2 5% 1/4W CARBON	MULLARD	CR25	–
R126	013651	3K65 1% 50 ppm MF	HOLCO	H8	1
R127	000106	10M 10% 1/4W CARBON	MULLARD	CR25	–
R128	042215	22M1 1% 100 ppm CF	ALLEN-BRADLEY	CC	2
R129	042215	22M1 " 100 ppm	"	"	–
R130	000362	3K6 5% 1/4W CARBON	MULLARD	CR25	2
R131	000362	3K6 " " "	"	"	–
R132	000105	1M " " "	"	"	–
R133	000105	1M " " "	"	"	–
R134	000394	390K " " "	"	"	1
R135	000275	2M7 " " "	"	"	–
R136	000395	3M9 " " "	"	"	1
R137	000223	22K " " "	"	"	2
R138	000125	1M2 " " "	"	"	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

DATE	12-7-78	datron ELECTRONICS LTD	
DRAWN	B.J.	TITLE	1061 ANALOGUE PCB ASSEMBLY
CHECKED		DRAWING NUMBER	400328
APPROVED		SHEET	7 OF 24
DATE			

ISS	ECO	DATE	CHKD

JW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R139	000336	33M 10% ¼W CARBON	ALLEN-BRADLEY	CB3361	1
R140	090049	18M MATCHED PAIR	HOLCO		1 PAIR
R141	090049	18M " "	"		
R142	000272	2K7 5% ¼W CARBON	MULLARD	CR25	1
R143	090039	3M3, 10M INPUT ATTEN. SET	MANN		1 SET.
R144	000100	10R 5% ¼W CARBON	MULLARD	CR25	-
R145	000100	10R " " "	"	"	-
R146	000222	2K2 " " "	"	"	-
R147	000752	7K5 " " "	"	"	1
R148	090039	100K, 10M INPUT ATTEN. SET	MANN		-
R149	090039	3M3, " " " "	"		-
R150	063204	200K POT CERMET	BECKMAN	72P	1
R151	063205	2M POT CERMET	"	"	1
R152		FSV	HOLCO	H8C	-
R153	011822	18K2 1% ⅛W MF	HOLCO	H8	1
R154	000103	10K 5% ¼W CARBON	MULLARD	CR25	-
R155	000221	220R " " "	"	"	-
R156	090039	3M3, 10M INPUT ATTEN SET	MANN		-
R157	000103	10K 5% ¼W CARBON	MULLARD	CR25	-
R158	000332	3K3 " " "	"	"	1
R159	063103	10K POT CERMET	BECKMAN	72P	1
R160	063504	500K " "	"	"	1
R161	000104	100K 5% ¼W CARBON	MULLARD	CR25	-

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD														

DATE 12-7-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSEMBLY.

DRAWING NUMBER 400328 SHEET 8 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R162	000392	3K9 5% ¼W CARBON	MULLARD	CR25	-
R163	000107	100M 10% ¼W CARBON	ALLEN-BRADLEY	CB1071	1
R164	000104	100K 5% ¼W CARBON	MULLARD	CR25	-
R165	000104	100K " " "	"	"	-
R166	000563	56K 5% " "	"	"	-
R167	000562	5K6 " " "		"	-
R168	000563	56K " " "		"	-
R169	000563	56K " " "		"	-
R170	000564	560K " " "		"	2
R171	000564	560K " " "			-
R172	000335	3M3 10% ¼W CARBON	MULLARD	CR25	1
R173	000680	68R 5% " " "		"	2
R174	000152	1K5 " " "		"	2
R175	000822	8K2 " " "		"	-
R176	000680	68R " " "		"	-
R177	000152	1K5 " " "		"	-
R178	000822	8K2 " " "		"	-
R179	440067	PART OF KIT	DATRON.		1
R180	440067	" " "	"		-
R181	440067	" " "	"		-
R182	000472	4K7 5% ¼W CARBON	MULLARD	CR25	-
R183	000472	4K7 5% "	"	"	-
R184	000270	27R " " "		"	2

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD														

DATE 12-7-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSEMBLY.

DRAWING NUMBER 400328 SHEET 9 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R185	000270	27R 5% 1/4W CARBON	MULLARD	CR25	-
R186	000104	100K " " "		"	-
R187	000222	2K2 " " "		"	-
R188	000103	10K " " "		"	-
R189	000103	10K " " "		"	-
R190	000561	560R " " "			2
R191	000561	560R " " "			-
R192	000155	1M5 " " "			1
R193	000104	100K "			-
R194	011213	121K 1% 1/8W M F	HOLCO	H8	-
R195	015112	5IK1 " " "		"	1
R196	000223	22K 5% 1/4W CARBON	MULLARD	CR25	-
R197	000222	2K2			-
R198	011002	10K 1% 1/8W M.F	HOLCO	H8	1
R199	008007	10R 5% 0·2W CARBON	MULLARD	CR16	2
R200	008007	10R			-
R201	000824	820K 5% 1/4W CARBON	MULLARD	CR25	-
R202	000103	10K			-
R203	000104	100K			-
R204	000105	1M			-
R205	000105	1M			-
R206	000563	56K			-
R207	000103	10K			-

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS															
ECO															
DATE															
CHKD															

DATE 12-7-78
DRAWN B J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSEMBLY.

DRAWING NUMBER 400328

SHEET 10 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy.
R208	000333	33K 5% 1/4W CARBON	MULLARD	CR25	1
R209	000563	56K " "		"	-
R210	000103	10K "		"	-
R211	050038	6K34 1% 15 ppm MF	ACI	EE-0·100 C4	-
R212	050034	825R 1% 15ppm MF	ACI	EE-0·100 C4	-
R213	050037	4K75 1% 15ppm MF	ACI	EE-0·100 C4	-
R214	070115	12KO 1% 10ppm WW	MANN	MX125	-
R215	000271	270R 5% 1/4W CARBON	MULLARD	CR25	-
R216	000271	270R 5% 1/4W CARBON	MULLARD	CR25	-
R217		NOT USED			-
R218	090063	P.T.C. THERMISTOR	TEXAS	TSP102K	1
R219	000224	220K 5% 1/4W CARBON	MULLARD	CR25	3
R220	000124	120k " " "	"	"	-
R221	000224	220K " " "	"	"	-
R222	000224	220K " " "	"	"	-
R223					
R224					2
R225					-
R226					
R227	000471	470R 5% 1/4W CARBON	MULLARD	CR25.	1
R228		NOT USED			-
R229		NOT USED			-
R230		NOT USED			-

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS															
ECO															
DATE															
CHKD															

DATE 12-7-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSEMBLY.

DRAWING NUMBER 400328

SHEET 11 OF 24

J W 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy.
R231		NOT USED			—
R232		NOT USED			—
R233		NOT USED			—
R234		NOT USED			—
R235		NOT USED			—
R236	016192	61k9 1% ⅛W 50ppm MF	HOLCO	H8C	2
R237	016192	61k9 1% ⅛W 50ppm MF	HOLCO	H8C	—
AN1	090050	3K3 SIP NETWORK	BECKMAN	764-1-R3-3K	1
AN2	090042	R-2R LADDER NETWORK	ERIE		1
C1	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	12
C2	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C3	104017	0·5pF 500V CER DISC	ERIE	831	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																							
ECO																							
DATE																							
CHKD																							

DATE 29-10-79
DRAWN B. JACKSON
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSY.

DRAWING NUMBER 400328

SHEET 12 OF 24

J W 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C4	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C5	102471	470pF 500V CER DISC	ERIE	801	3
C6	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C7	150020	10µF " " "			—
C8	102150	15pF 500V CER DISC	ERIE	801	1
C9	140016	0·47µF 400V POLYPROP	RIFA	PHE 412 HFK	1
C10	110015	0·015µF 63V POLYESTER	WIMA	FKS2	1
C11	120026	680pF 20% 100v POLYCARB	WIMA	FKC2 MIN	1
C12	120004	680nF 10% 63v POLYCARB	ASHCROFT	A2B6811B	1
C13	102101	100pF 500V CER DISC	ERIE	801	3
C14	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C15	150020	10µF " " " "			—
C16	102101	100pF 500V CER DISC	ERIE	801	—
C17	102100	10pF 500V CER DISC	ERIE	801	1
C18	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C19	150020	10µF " " " "			—
C20	102470	47pF 500V CER DISC	ERIE	801	6
C21	102470	47pF 500V CER DISC	ERIE	801	—
C22	102101	100pF 500V CER DISC			—
C23	101103	0·01µF 250V CER DISC			6
C24	101103	0·01µF 250V CER DISC	"	"	—
C25	150020	10µF 20% 25V DIP TANT	UNION CARBIDE	K10E25	—
C26	102471	470pF 500V CER DISC	ERIE	801	—

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS																							
ECO																							
DATE																							
CHKD																							

DATE 12-7-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSEMBLY.

DRAWING NUMBER 400328

SHEET 13 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
C27	101103	0·01μF 250V CER DISC	ERIE	801	–
C28	102470	47pF 500V "	"	"	–
C29	102470	47pF 500V "	"	"	–
C30		NOT USED			
C31	130073	1nF 5% 160V POLYSTYRENE	SUFLEX	HSC1000/5-10/160	1
C32	101103	0·01μF 250V CER DISC	ERIE	801	–
C33	110013	0·1μF 10% 250V POLYESTER	MULLARD	C280AE/P100K	3
C34	101103	0·01μF 250V CER DISC	ERIE	801	–
C35	120016	2n2F 20% 100V POLYCARB	WIMA	FKC2MIN.	1
C36	102471	470pF 500V CER DISC			–
C37	110013	0·1μF 10% 250V POLYESTER	MULLARD	C280AE/P100K	–
C38	102470	47pF 500V CER DISC	ERIE	801	–
C39	440067	PART OF KIT	DATRON		–
C40	440067	" " "	"		–
C41	440067	" " "	"		–
C42	110013	0·1μF 10% 250V POLYESTER	MULLARD	C280AE/P100K	–
C43	150020	10μF 20% 25V DIP TANT	UNION CARBIDE	K10E25	–
C44	150020	10μF			–
C45	180006	47μF 25V AL.ELECT	MULLARD	016-16479	2
C46	180006	47μF 25V			–
C47	180022	33μF 40V		016-17339	2
C48	180022	33μF 40V			–
C49	180024	10μF 63V AL.ELECT	MULLARD	016-18109	2

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																					
ECO																					
DATE																					
CHKD																					

DATE	12-7-78
DRAWN	BJ
CHECKED	
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: 1061 ANALOGUE PCB ASSEMBLY

DRAWING NUMBER 400328 | SHEET 14 OF 24

JW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C50	180024	10μF 63V AL.ELECT	MULLARD	016-18109	–
C51	101103	0·01μF 250V CER DISC	ERIE	801	–
C52	110017	0·022μF 10% 250V POLYESTER	MULLARD	C280AE/P22K	1
C53	102332	3n3F 500V CER DISC	ERIE	801	2
C54	102332	3n3F	"	"	–
C55	440067	PART OF KIT.	DATRON.		–
C56	150016	1μF 20% 35V DIP TANT	UNION CARBIDE	K1R0E35	1
C57	130013	18pF ±1pF 160V POLYSTYRENE	SUFLEX	HS	1
C58	110027	3300pF 20% 100V POLYESTER	WIMA	FKS2-MIN	1
C59		NOT USED			–
C60	102222	2n2F 500V CER DISC	ERIE	801	1
D1	200008	Si LOW LEAKAGE	FAIRCHILD	IN458A	25
D2	210056	C5V6 400mW ZENER	MULLARD	BZY88C	2
D3	200008	Si LOW LEAKAGE	FAIRCHILD	IN458A	–
D4	210056	C5V6 400mW ZENER	MULLARD	BZY88C	–
D5	200001	Si GEN. PURPOSE	FAIRCHILD	IN414B	18
D6	200008	Si LOW LEAKAGE	FAIRCHILD	IN458A	–

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS																					
ECO																					
DATE																					
CHKD																					

DATE	12-7-78
DRAWN	BJ
CHECKED	
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: 1061 ANALOGUE PCB ASSEMBLY

DRAWING NUMBER 400328 | SHEET 15 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
D7	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D8	210082	CBV2 400mW ZENER	MULLARD	BZY88C	1
D9	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D10	200008	" " "			–
D11	200008	" " "			–
D12	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D13	200001	" " "		"	–
D14	200001	" " "		"	–
D15	200001	" " "		"	–
D16	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D17	200008	" " "		"	–
D18	210068	C6V8 400mW ZENER	MULLARD	BZY88C	2
D19	210068	" " "		"	–
D20	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D21	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D22	210220	C22V 400mW ZENER	MULLARD	BZY88C	2
D23	210220	" " "		"	–
D24	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D25	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D26	200008	" " "		"	–
D27	200008	" " "		"	–
D28	200008	" " "		"	–
D29	200008	" " "		"	–

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																							
ECO																							
DATE																							
CHKD																							

DATE	12-7-78
DRAWN	B.J
CHECKED	
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: 1061 ANALOGUE PCB ASSEMBLY

DRAWING NUMBER 400328 | SHEET 16 OF 24

J.W 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D30	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D31	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D32	200001	" " "		"	–
D33	200001	" " "		"	–
D34	200001	" " "		"	–
D35	210047	C4V7 400mW ZENER	MULLARD	BZY88C	1
D36	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	–
D37	200008	" " "		"	–
D38	200008	" " "		"	–
D39	200008	" " "		"	–
D40	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D41	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D42	200001	" " "		"	–
D43	200002	Si RECTIFIER 1A 50V	MOTOROLA	1N4001	4
D44	200002	" " "		"	–
D45	200002	" " "		"	–
D46	200002	" " "		"	–
D47	210150	C15V 400mW ZENER	MULLARD	BZY88C	1
D48	200001	Si GEN PURPOSE	FAIRCHILD	1N4148	–
D49	210200	C20V 400mW ZENER	MULLARD	BZY88C	2
D50	210100	C10V 400mW ZENER	MULLARD	BZY88C	2
D51	210100	" " "	"	"	
D52	210200	C20V 400mW ZENER	MULLARD	BZY88C	–

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS																							
ECO																							
DATE																							
CHKD																							

DATE	12-7-78
DRAWN	B.J.
CHECKED	
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: 1061 ANALOGUE PCB ASSEMBLY.

DRAWING NUMBER 400328 | SHEET 17 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
D53	200008	SI LOW LEAKAGE	FAIRCHILD	IN458A	–
D54	200008	" "	"	"	–
D55	200001	SI GEN PURPOSE		IN4148	–
D56	200001	" "		"	–
D57		NOT USED			–
D58		NOT USED			–
D59	219007	214009 SELECTED WITH R18			2
D60	219007	214009 SELECTED WITH R19			–
D61	210033	C3V3 400 mW ZENER	MULLARD	BZY88C3V3	2
D62	210033	" "		"	–
D63	200001	SI GEN PURPOSE	FAIRCHILD	IN4148	–
D64	210120	12V 400mW ZENER	MULLARD	BZY88C12	2
D65	210120	12V 400mW ZENER	MULLARD	BZY88C12	–
D66	200008	SI LOW LEAKAGE	FAIRCHILD	IN458A	–
D67	200008	" "	"	"	–
D68	200008	" " "	"	"	–

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																							
ECO																							
DATE																							
CHKD																							

DATE 12-7-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSEMBLY

DRAWING NUMBER 400328 SHEET 18 OF 24

JW 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
Q1	230001	N CHAN CURRENT LIM	SILICONIX	E506	2
Q2	250008	SIL PNP TRANSISTOR	NATIONAL	BC214C/TO18	2
Q3	250008	SIL PNP TRANSISTOR	NATIONAL	BC214C/TO18	–
Q4	230001	N CHAN CURRENT LIM	SILICONIX	E506	–
Q5	230027	LOW LEAKAGE N-FET	TELEDYNE	U3114	7
Q6	230027	" " "	"	"	–
Q7	230027	" " "	"	"	–
Q8	230027	" " "	"	"	–
Q9	230027	" " "	"	"	–
Q10	230027	" " "	"	"	–
Q11	230027	" " "	"	"	–
Q12	240017	LOW DRIFT DUAL NPN TRANS	NATIONAL	LM394	1
Q13	230002	N-CHAN J-FET	TELEDYNE	U1994E	6
Q14	230002	" "	"	"	–
Q15	230002	" "	"	"	–
Q16	230002	" "	"	"	–
Q17		NOT USED			
Q18	230002	N-CHAN J-FET	TELEDYNE	U1994E	–
Q19	230002	" "	"	"	–
Q20	240006	SI NPN	FAIRCHILD	2N3904	5
Q21	240006	"	"	"	–
Q22	240006	"	"	"	–
Q23	240006	"	"	"	–

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																							
ECO																							
DATE																							
CHKD																							

DATE 17-11-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSEMBLY

DRAWING NUMBER 400328 SHEET 19 OF 24

JW 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy
Q24	240014	Si NPN	FAIRCHILD	BC557	2
Q25	250011	Si PNP	"	BC327	2
Q26	250011	" "	"	"	–
Q27	250001	Si PNP	"	BC214	2
Q28	240014	Si NPN	"	BC557	–
Q29	240001	Si NPN	"	BC184	3
Q30	240006	Si NPN	"	2N3904	–
Q31	250004	Si PNP	"	2N3906	1
Q32	240001	Si NPN	"	BC184	–
Q33	240001	Si NPN	"	BC184	–
Q34	250001	Si PNP	"	BC214	–
Q35	230031	N-CHAN DUAL JFET	TELEDYNE	SU2656M	2
Q36	230031	N-CHAN DUAL JFET	TELEDYNE	SU2656M	–

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																							
ECO																							
DATE																							
CHKD																							

DATE	17-11-78
DRAWN	BJ
CHECKED	
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: 1061 ANALOGUE PCB ASSEMBLY

DRAWING NUMBER: 400328

SHEET 20 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M1	220018	HI SPEED OPTO COUPLER	HEWLETT PACKARD	HP4351	4
M2	220017	DUAL OPTO ISOLATOR	FAIRCHILD	FCD880	6
M3	260002	LINEAR IC OP. AMP.	"	741HC	2
M4	220018/S61	HI SPEED OPTO COUPLER	HEWLETT PACKARD	HP4351	–
M5	220018/S61	" "		"	–
M6	220018	" " "		"	–
M7	220023	50 CTR DUAL OPTO ISOLATOR	FAIRCHILD	FCD880/50CTR	1
M8	220017	DUAL OPTO ISOLATOR		FCD880	–
M9	220017	" "	"	"	–
M10	220017	" " "	"	"	–
M11	220017	" " "	"	"	–
M12	280075	DUAL 4 I/P NAND	MOTOROLA	MC14012 BCP	1
M13	280015	QUAD LATCH	MOTOROLA	MC14076 BCP	4
M14	280015	" "		"	–
M15	260029	VOLTAGE COMPARATOR	NATIONAL	LM311HC	1
M16	280082	HEX INVERTER	FAIRCHILD	F40014BPC	1
M17	280079	QUAD 2 I/P OR GATE	MOTOROLA	MC14071 BCP	1
M18	280008	QUAD 2 I/P NAND GATE	"	MC14011 BCP	3
M19	280008	" " " "	"	"	–
M20	280015	QUAD LATCH	"	MC14076 BCP	–
M21	280015	" "	"	"	–
M22	260035	5534 OP AMP	SIGNETICS	NE5534T	1
M23	220019	DUAL OPTO ISOLATOR	FAIRCHILD	FCD880/SELECTED	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																							
ECO																							
DATE																							
CHKD																							

DATE	12-7-78
DRAWN	B.J.
CHECKED	
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: 1061 ANALOGUE PCB ASSEMBLY.

DRAWING NUMBER: 400328

SHEET 21 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
M24	220017	DUAL OPTO ISOLATOR	FAIRCHILD	FCD880	-
M25	260022	LINEAR IC OP AMP	NATIONAL	LF 355	2
M26	280022	QUAD BILATERAL SWITCH	MOTOROLA	MC14016 BCP	1
M27	280008	QUAD 2 I/P NAND GATE	"	MC14011 BCP	-
M28	280044	BINARY UP/DOWN COUNTER	"	MC14516 BCP	1
M29	280011	DUAL D FLIP-FLOP	"	MC14013 BCP	1
M30	260026	LINEAR IC OP AMP	NATIONAL	LM212H	2
M31	260022	" " "	"	LF 355	-
M32	260026	" " "	"	LM212H	-
M33	260002	" " "	FAIRCHILD	741 HC	-
M34	260013	" " "	NATIONAL	LF 356 H	1
M35	290081	4051 MUX SELECTED	DATRON	MC14051 BCL (WHITE)	1
M36	290047	212 OP AMP SELECTED	DATRON	LM212H (GREEN/WHITE)	1
M37		NOT USED			
M38		NOT USED			
M39	260028	DUAL LINEAR IC	FAIRCHILD	μA1458CTC	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE 12-7-78
DRAWN B J
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSEMBLY.

DRAWING NUMBER 400328

SHEET 22 OF 24

J.W 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
RL1	330003	RELAY 2P2W CROSS BAR	P & B	R10-E1-L2-Q5-BK-(25207)	1
RL2	330012	RELAY REED 1A GUARDED	HAMLIN	HE721A5134	1
	400379/1	WIRE / TERMINAL ASSY			7
	400379/2	" " "			4
	410095-5A	P.C.B.			1
	459112	RELAY BRACKET	KDP		1
	540002	22 SWG TINNED COPPER WIRE			A/R
	540008	7/0.2 PTFE INSUL WHITE WIRE			165mm
	590001	SLEEVE MAXCABLE Ø 3.0	HELLERMANN ELECTRIC	H15 x 20mm BLK HELSYN	5
	590004	SLEEVE - PTFE	-"- -"-	FE10	90mm
	590055	SLEEVE Ø 1.0 SIL RUBBER	-"- -"-	HIS CONT. BLACK	250mm
	602001	F.S.V. TERMINAL	MOLEX	02-04-1875	6
J2,3,4,5	605002	16 WAY DIL SOCKET	JERMYN	A23-2001/Y	4
	605060	14 WAY DIL SOCKET	ASTRALUX	ICL143-S3T	8
	605061	16 WAY DIL SOCKET	ASTRALUX	ICL143-S6T	12
J1 & J6	605052	8 WAY POLARISED SOCKET	MOLEX	22-01-2085	2
	605059	8 WAY DIL SOCKET	ASTRALUX	ICL-083-S6T	3
	606005	CLIP FOR 605002	ANTIFERRENCE	RC-74	4

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE 12-7-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSEMBLY

DRAWING NUMBER 400328

SHEET 23 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy.
	611004	SCREW M3 x 6mm POZI-PAN	GKN	ZINC PLATED	1
	613005	WASHER M3 INT/SHAKEPROOF ST	GKN	" "	1
	615002	NUT M3 FULL HEX STEEL		" "	1
	617010	NYLATCH PLUNGER HN3P	RICHCO	HN3P-32-4-1	8
	617011	" GROMMET HN3G	"	HN3G-32-1	8
	620005	CLOVERLEAF P.T.F.E. TERM.	SEALECTRO	FTE 15 P20	10
	620003	SOLDER PCB TERMINAL LUG	HARWIN	HZ105A	4
	630036	STANDARD STEATITE INSUL BEAD	PARK ROYAL PORCELAIN CO	TYPE N°1 (18 SWG)	6
	615005	NUT 3-48 UNC FULL HEX STEEL.			1
	613014	WASHER M2·5 INT/SHAKEPROOF ST.	GKN DISTRIBUTORS.	ZINC PLATED	1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS																							
ECO																							
DATE																							
CHKD																							

DATE 12-7-78

DRAWN BJ

CHECKED

APPROVED

DATE

datron ELECTRONICS LTD

TITLE 1061 ANALOGUE PCB ASSEMBLY

DRAWING NUMBER 400328

SHEET 24 OF 24

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	000103	10k 5% ¼W CARBON	MULLARD	CR25	21
R2	000103	10k " " "	"	"	—
R3	000103	10k " " "	"	"	—
R4	000103	10k " " "	"	"	—
R5	000103	10k " " "	"	"	—
R6	000102	1k " " "	"	"	9
R7	000103	10k " " "	"	"	—
R8	000472	4k7 " " "	"	"	8
R9	000102	1k " " "	"	"	—
R10	000684	680k " " "	"	"	3
R11	063204	200k POT CERMET	BECKMAN	72P	1
R12	000103	10k 5% ¼W CARBON	MULLARD	CR25	—
R13	000102	1k " " "	"	"	—
R14		NOT USED			—
R15	000472	4k7 5% ¼W CARBON	"	"	—
R16	000332	3k3 " " "	"	"	3
R17	000683	68k " " "	"	"	2
R18	000222	2k2 " " "	"	"	7
R19	000393	39k " " "	"	"	1
R20	000104	100k			15
R21	000104	100k			—
R22	000104	100k " " "	"	"	—
R23	000221	220R " " "	"	"	2

NOTES. CIRCUIT DIAGRAM = 450329
CHECK PROCEDURE = 460329
CHECK LIST = 470329
SEE SHEET 2 FOR LATEST ISSUE

ISS	16	17
ECO	1147	1188
DATE	25.9.80	6.1.81
CHKD	AP	AP

DATE 26.6.78
DRAWN IL.
CHECKED P.A.H.
APPROVED
DATE

datron ELECTRONICS LTD
TITLE 1061 DIGITAL PCB. ASSY.
DRAWING NUMBER 400329
SHEET 2 OF 16

JW 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy
R24	000102	1k 5% ¼W CARBON	MULLARD	CR25	—
R25	000332	3k3 " " "	"	"	—
R26	000103	10k " " "	"	"	—
R27	000102	1k " " "	"	"	—
R28	000682	6k8 " " "	"	"	1
R29	000104	100k " " "	"	"	—
R30		NOT USED			—
R31	000472	4k7 " " "	"	"	—
R32	000472	4k7 " " "	"	"	—
R33	000222	2k2 " " "	"	"	—
R34	000104	100k " " "	"	"	—
R35	000104	100k " " "	"	"	—
R36	000104	100k " " "	"	"	—
R37	000106	10M 10% " "	"	"	1
R38	000104	100k 5% " "	"	"	—
R39	000103	10k " " "	"	"	—
R40	000103	10k " " "	"	"	—
R41	000332	3k3 " " "	"	"	—
R42	000103	10k " " "	"	"	—
R43	000104	100k " " "	"	"	—
R44	000103	10k " " "	"	"	—
R45	000334	330k " " "	"	"	2
R46	000472	4k7 " " "	"	"	—

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS	
ECO	
DATE	
CHKD	

DATE
DRAWN IL.
CHECKED P.A.H.
APPROVED
DATE

datron ELECTRONICS LTD
TITLE 1061 DIGITAL PCB. ASSY.
DRAWING NUMBER 400329
SHEET 3 OF 16

JW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R47	000103	10k 5% ¼W CARBON	MULLARD	CR25	—
R48	000104	100k " " "	"	"	—
R49	000103	10k " " "	"	"	—
R50	000104	100k " " "	"	"	—
R51	000562	5kG " " "	"	"	1
R52	000224	220k " " "	"	"	1
R53	000123	12k " " "	"	"	1
R54	000105	1M " " "	"	"	1
R55	000684	680k " " "	"	"	—
R56	000104	100k " " "	"	"	—
R57		NOT USED			—
R58	000100	10R " " "	"	"	2
R59	000220	22R " " "	"	"	2
R60	000220	22R " " "	"	"	—
R61	000100	10R " " "	"	"	—
R62		NOT USED			—
R63	000222	2k2 5% ¼W CARBON	MULLARD	CR25	—
R64	000222	2k2 " " "	"	"	—
R65	000103	10k " " "	"	"	—
R66	000103	10k " " "	"	"	—
R67	000271	270R " " "	"	"	1
R68	000103	10k " " "	"	"	—
R69	000561	560R " " "	"	"	1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE	datron ELECTRONICS LTD
DRAWN IL.	TITLE 1061 DIGITAL PCB. ASSY.
CHECKED P.R.H.	
APPROVED	DRAWING NUMBER 400329
DATE	SHEET 4 OF 16

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R70	000222	2k2 5% ¼W CARBON	MULLARD	CR25	—
R71	000102	1k " " "	"	"	—
R72	000221	220R " " "	"	"	—
R73	000102	1k " " "	"	"	—
R74	000124	120k " " "	"	"	1
R75	000471	470R " " "	"	"	1
R76	000824	820k " " "	"	"	1
R77		NOT USED			—
R78		NOT USED			—
R79	000472	4k7 " " "	"	"	—
R80	000683	68k " " "	"	"	—
R81	000183	18k " " "	"	"	1
R82	000334	330k " " "	"	"	—
R83	063202	2k POT CERMET	BECKMAN	72 P	1
R84	000223	22k 5% ¼W CARBON	MULLARD	CR25	1
R85	000472	4k7 " " "	"	"	—
R86		NOT USED			—
R87	000104	100k			—
R88	000103	10k " " "	"	"	—
R89	000103	10k " " "	"	"	—
R90		NOT USED			—
R91	012002	20kΩ 1% ⅛W 50ppm MF	HOLCO	H8C	1
R92	015231	5k23 " " "	"	"	1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE	datron ELECTRONICS LTD
DRAWN IL.	TITLE 1061 DIGITAL PCB. ASSY.
CHECKED P.R.H.	
APPROVED	DRAWING NUMBER 400329
DATE	SHEET 5 OF 16

JW 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
R93		NOT USED			—
R94	000102	1k 5% ¼W CARBON	MULLARD	CR25	—
R95	000472	4k7 " " "	"	"	—
R96	000103	10k " " "	"	"	—
R97	000222	2k2 " " "	"	"	—
R98		NOT USED			—
R99	000104	100k 5% ¼W CARBON	"	"	—
R100	000104	100k " "	"	"	—
R101	000684	680k " "	"	"	—
R102	000103	10k " " "	"	"	—
R103	000222	2k2 " "	"	"	—
R104	000102	1k " "	"	"	—
AN1	090046	10k x 7 2% NETWORK	BECKMAN	764-1-R10k	5
AN2		NOT USED			—
AN3	090046	10k x 7 2% NETWORK	BECKMAN	764-1-R10K	—
AN4	090042	8 BIT 'R-2R' LADDER NETWORK	SEE DRG		1
AN5	090046	10k x 7 2% NETWORK	BECKMAN	764-1-R10K	—
AN6	090046	10k x 7 2% NETWORK	BECKMAN	764-1-R10K	—
AN7	090046	10k x 7 2% NETWORK	BECKMAN	764-1-R10K	—

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE

DRAWN IL.

CHECKED P.R.M.

APPROVED

DATE

datron ELECTRONICS LTD

TITLE 1061 DIGITAL PCB. ASSY.

DRAWING NUMBER 400329

SHEET 6 OF 16

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
C1	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	14
C2	150002	10µF " " " "	" "	"	—
C3	150002	10µF " " " "	" "	"	—
C4	150016	1µF " 35v " "	" "	K1R0E35	7
C5	110013	·1µF 10% 250v POLYESTER	MULLARD	C280AE/P100k	3
C6	101103	·01µF 250v CER DISC	ERIE	801	6
C7	150006	4·7µF 20% 16v DIP TANT	UNION CARBIDE	K4R7E16	1
C8		NOT USED			—
C9	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	—
C10	102101	100pF 500v CER DISC	ERIE	801	5
C11	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	—
C12	150016	1µF " 35v " "	" "	K1R0E35	—
C13	150002	10µF " 16v " "	" "	K10E16	—
C14	110013	0·1µF 10% 250v POLYESTER	MULLARD	C280AE/P100K	—
C15	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K1R0E16	—
C16	102221	220pF 500v CER DISC	ERIE	801	3
C17	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	—
C18	150002	10µF " " " "	" "	"	—
C19	150016	1µF " 35v " "	" "	K1R0E35	—
C20	150002	10µF " " " "	" "	K10E16	—
C21	102101	100pF 500v CER DISC	ERIE	801	—
C22	101103	·01µF 250v CER DISC	ERIE	801	—
C23	120016	2n2F 20% 100v POLYCARD	WIMA	FKC 2MIN	1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE

DRAWN IL.

CHECKED P.R.M.

APPROVED

DATE

datron ELECTRONICS LTD

TITLE 1061 DIGITAL PCB. ASSY.

DRAWING NUMBER 400329

SHEET 7 OF 16

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy.
C24	130016	130pF 2½% 25v POLYSTYRENE	SUFLEX	HSQ130/2½-7/25	1
C25	102471	470pF 500v CER DISC	ERIE	801	2
C26	150016	1µF 20% 35V DIP TANT	UNION CARBIDE	KIROE35	—
C27	150002	10µF " 16V " "	" "	K10E16	—
C28	102220	22pF 500v CER DISC	ERIE	801	3
C29	150016	1µF 20% 35V DIP TANT	UNION CARBIDE	KIROE35	—
C30	150002	10µF 20% 16V " "	" "	K10E16	—
C31	110005	·01µF 10% 250v POLYESTER	MULLARD	C280AE/P10K	1
C32	110003	·068µF			1
C33	150014	·68µF 20% 35v DIP TANT	UNION CARBIDE	KR68E35	1
C34	101103	·01µF 250v CER DISC	ERIE	801	—
C35	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	—
C36	101103	·01µF 250v CER DISC	ERIE	801	—
C37	102220	22pF 500v CER DISC		"	—
C38	102221	220pF 500v " "	"	"	—
C39	101103	·01µF 250v " "	"	"	—
C40	110013	·1µF 10% 250v POLYESTER	MULLARD	C280AE/P100K	—
C41	110027	3n3F 20% 100V POLYESTER	WIMA	FKS2MIN	1
C42	102471	470pF 500v CER DISC	ERIE	801	—
C43	102101	100pF 500v CER DISC.	"	801	—
C44	150002	10µF 20% 16v DIP TANT	UNION CARBIDE	K10E16	—
C45	150016	1µF 20% 35v " "	" "	KIROE35	—
C46	102220	22pF 500v CER DISC	ERIE	801	—

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS	
ECO	
DATE	
CHKD	

DATE

DRAWN IL.

CHECKED P.R.M.

APPROVED

DATE

datron ELECTRONICS LTD

TITLE 1061 DIGITAL PCB. ASSY.

DRAWING NUMBER 400329

SHEET 8 OF 16

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
C47	150004	100µF 20% 6V3 DIP. TANT.	UNION CARBIDE	K100E6V3	1
C48		NOT USED			—
C49	101103	·01µF 250v CER. DISC	ITT	CD10	—
C50	102101	100pF 500v CER. DISC	ITT	801	—
C51	102101	100pF 500v CER. DISC	ITT	801	—
C52		NOT USED			—
C53	102221	220pF 500v CER. DISC	ERIE	801	—
C54	130008	68pF 5% 160v POLYSTYRENE	SUFLEX	HS	1
C55	150016	1µF 20% 35v DIP. TANT	UNION CARBIDE	K10E16	—

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS	
ECO	
DATE	
CHKD	

DATE

DRAWN IL.

CHECKED

APPROVED

DATE

datron ELECTRONICS LTD

TITLE 1061 DIGITAL PCB. ASSY.

DRAWING NUMBER 400329

SHEET 9 OF 16

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
D1	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	10
D2	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—
D3	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—
D4	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—
D5	200008	200mA 125v LL Si DIODE	FAIRCHILD	IN458A	1
D6	220010	Si HOT CARRIER DIODE	HP	HSCH1001/IN6263	1
D7	210027	2V7 400mW ZENER	MULLARD	BZY88C2V7	1
D8	210033	3V3 400mW ZENER	MULLARD	BZY88C3V3	1
D9	220022	DUAL 37pF VARICAP DIODE	THOMPSON – CSF	BB204B	2
D10	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—
D11	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—
D12	200002	1A. 50v. GP. Si. DIODE	FAIRCHILD	IN4001	2
D13	213006	5V 5W ZENER	UNITRODE	TVS505	1
D14	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—
D15	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—
D16	200002	1A. 50v. GP. Si. DIODE	FAIRCHILD	IN4001	—
D17	200001	Si GP. DIODE	FAIRCHILD	IN4148	—
D18		NOT USED			—
D19		NOT USED			—
D20	220022	DUAL 37pF VARICAP DIODE	THOMPSON – CSF	BB204B	—
D21	200001	75mA 75v GP. Si. DIODE	FAIRCHILD	IN4148	—

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE

DRAWN IL

CHECKED

APPROVED

DATE

datron ELECTRONICS LTD

TITLE 1061 DIGITAL PCB. ASSY.

DRAWING NUMBER 400329

SHEET 10 OF 16

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
Q1	240001	Si NPN TRANSISTOR	NATIONAL	BC184	5
Q2	240001	" " "	"	"	—
Q3	240007	" " "	"	2N3646	2
Q4		NOT USED			—
Q5	240006	Si NPN TRANSISTOR	NATIONAL	2N3904	2
Q6	250004	Si PNP "	"	2N3906	3
Q7	250004	" " "	"	"	—
Q8	240001	" NPN "	"	BC184	—
Q9	240001	" " "	"	"	—
Q10	250001	" PNP "	"	BC214	1
Q11					—
Q12	250011	" PNP "	"	BC327	1
Q13	240007	" NPN "	"	2N3646	—
Q14	240001	" " "	"	BC184	—
Q15	240006	" " "	"	2N3904	—
Q16	250004	" PNP "	"	2N3906	—
Q17	250008	" " "	"	BC214KC	1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE

DRAWN IL.

CHECKED P.R.H.

APPROVED

DATE

datron ELECTRONICS LTD

TITLE 1061 DIGITAL PCB. ASSY.

DRAWING NUMBER 400329

SHEET 11 OF 16

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy
M1	280011	DUAL D FLIP-FLOP	MOTOROLA	MC14013BCP	2
M2	280022	QUAD BILATERAL SWITCH	"	MC14016BCP	1
M3	280024	TRI-STATE HEX NON-INV. BUFFER	"	MC14503BCP	7
M4	280024	" " " " " "	"	"	–
M5	280024	" " " " " "	"	"	–
M6	280024	" " " " " "	"	"	–
M7	280015	QUAD LATCH	"	MC14076BCP	5
M8	280015	" "	"	"	–
M9	280015	" "	"	"	–
M10	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503BCP	–
M11	280015	QUAD LATCH	"	MC14076BCP	–
M12	280015	" "	"	"	–
M13	280044	BINARY UP/DOWN COUNTER	"	MC14516BCP	4
M14	280044	" " " "	"	"	–
M15	290003	TIMER - ASTABLE	SIGNETICS	NE 555V	3
M16	270058	DUAL 1-of-4 DECODER	NATIONAL	74LS155	2
M17	270048	QUAD 2 I/P NAND GATE	NATIONAL	74LS00	2
M18		NOT USED			–
M19	280066	256x4 BIT STATIC CMOS RAM	SEE DRAWING		4

NOTES

SEE SHEET 2 FOR LATEST ISSUE

DATE	datron ELECTRONICS LTD		
DRAWN IL.	TITLE	1061 DIGITAL PCB. ASSY.	
CHECKED P.R.W.			
APPROVED			
DATE	DRAWING NUMBER	400329	SHEET 12 OF 16

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M20	280066	256x4 BIT STATIC CMOS RAM	SEE DRAWING		–
M21, M21A	280037	HEX BUFFER	MOTOROLA	MC14050BCP	12
M22	280011	DUAL D FLIP-FLOP	"	MC14013BCP	–
M23	270053	A-D CHIP	FERRANTI	ZNA 2035	1
M24	280024	TRI-STATE HEX NON-INV. BUFFER	MOTOROLA	MC14503BCP	–
M25	280024	" " " " " "	"	"	–
M26	280006	DUAL J-K FLIP-FLOP	"	MC14027BCP	1
M27	280004	14BIT BINARY COUNTER	"	MC14020BCP	1
M28	270051	DUAL 4 I/P AND GATE	NATIONAL	74LS21	2
M29	270055	DUAL 4 I/P NAND GATE	"	74LS20	2
M30	290057/SU-34	4k x 8 EPROM - SEE PROG. SPEC		TMS 2532 JL/PROGRAM'D	1
M31	280066	256x4BIT STATIC CMOS RAM	SEE DRAWING		–
M32	270058	DUAL 1-of-4 DECODER	NATIONAL	74LS155	–
M33	270051	DUAL 4 I/P AND GATE	"	74LS21	–
M34	270055	DUAL 4 I/P NAND GATE	"	74LS20	–
M35	290056/SU-30	4k x 8 EPROM - SEE PROG. SPEC		TMS 2532 JL/PROGRAM'D	1
M36	280066	256x4BIT STATIC CMOS RAM	SEE DRAWING		–
M37	280025	QUAD BILATERAL SWITCH	MOTOROLA	MC14066BCP	2
M38	280071	TRIPLE 3 I/P NOR GATE	MULLARD	HEF4025P	2
M39	280017	HEX INVERTER	MOTOROLA	MC14069BCP	1
M40	280083	QUAD 2 I/P NOR GATE	MULLARD	HEF4001BP	1
M41	280044	BINARY UP/DOWN COUNTER	MOTOROLA	MC14516BCP	–
M42	280003	QUAD LATCH	"	MC14042BCP	2

NOTES

SEE SHEET 2 FOR LATEST ISSUE

DATE	datron ELECTRONICS LTD		
DRAWN IL	TITLE	1061 DIGITAL PCB. ASSY.	
CHECKED P.R.W.			
APPROVED			
DATE	DRAWING NUMBER	400329	SHEET 13 OF 16

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy
M43	290003	TIMER - ASTABLE	SIGNETICS	NE 555V	—
M44	270048	QUAD 2 I/P NAND GATE	NATIONAL	74 LS 00	—
M45	270050	HEX INVERTER	"	74 LS 04	1
M46	280025	QUAD BILATERAL SWITCH	MOTOROLA	MC14066BCP	—
M47	280070	DIVIDE-BY-8 COUNTER/DIVIDER	MULLARD	HEF 4022P	1
M48	280071	TRIPLE 3 I/P NOR GATE	"	HEF 4025P	—
M49	280023	QUAD 2 I/P NOR GATE	MOTOROLA	MC14001 BCP	1
M50	280044	BINARY UP/DOWN COUNTER	"	MC 14516 BCP	—
M51	280003	QUAD LATCH	"	MC 14042 BCP	—
M52	270056	8 I/P NAND GATE	NATIONAL	74 LS 30	1
M53	280061	MICRO PROCESSOR CHIP	MOTOROLA	MC 6800L	1
M54	270023	QUAD 2 I/P NAND GATE	NATIONAL	7437	1
M55	270054	QUAD 2 I/P AND GATE	"	74 LS 08	2
M56	270054	" " " "	"	"	—
M57	270057	DUAL JK FLIP-FLOP	"	74 LS 76	1
M58	280009	HEX INVERTER/BUFFER	MOTOROLA	MC 14049	2
M59	280009	HEX INVERTER/ BUFFER	MOTOROLA	MC 14049	—
M60, M62	260031	VOLTAGE DETECTOR	INTERSIL	ICL 8211	2
M61	290003	TIMER - ASTABLE	SIGNETICS	NE 555V	—
S1		NOT USED			—
S2		NOT USED			—
S3		NOT USED			—

NOTES

SEE SHEET 2 FOR LATEST ISSUE

| ISS | | |

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	400379/1	WIRE/TERMINAL ASSY.			8
J6		NOT USED			—
J7		NOT USED			—
	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	5

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE

DRAWN IL.

CHECKED P.R.H.

APPROVED

DATE

datron ELECTRONICS LTD

TITLE 1061 DIGITAL PCB. ASSY.

DRAWING NUMBER 400329

SHEET 16 OF 16

J W 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R1	000472	4k7 5% ¼W CARBON	MULLARD	CR25	3
R2	000103	10k " " "	"	"	2
R3	000183	18k " " "	"	"	1
R4	000103	10k " " "	"	"	–
R5	000104	100k " " "	"	"	1
R6		NOT USED			–
R7		NOT USED			–
R8	000102	1k 5% ¼W CARBON	MULLARD	CR25	19
R9	000102	1k " " "	"	"	–
R10	000102	1k " " "	"	"	–
R11	000102	1k " " "	"	"	–
R12	000102	1k " " "	"	"	–
R13	000102	1k " " "	"	"	–
R14	000102	1k " " "	"	"	–
R15	000102	1k " " "	"	"	–
R16		NOT USED			–
R17		NOT USED			–
R18	000102	1k " " "	"	"	–
R19	000102	1k " " "	"	"	–
R20	000102	1k " " "	"	"	–
R21		NOT USED			–
R22	000272	2k7 5% ¼W CARBON	"	"	5
R23	000472	4k7 " " "	"	"	–

NOTES CIRCUIT DIAGRAM = 430330
CHECK PROCEDURE = 460330
CHECK LIST = 470330

SEE SHEET 2 FOR LATEST ISSUE

ISS	C	1	2	3	4	5	6
ECO	–	–	789	822	854	904	1005 1045
DATE	2.5.78	29.9.78	17 Nov 78	26 FEB 79	10 MAY 79	21.6.79	3-1-80
CHKD	–	[illegible]	MJD	[illegible]	ND	AD	[illegible]

DATE	2.5.78
DRAWN	IL
CHECKED	[illegible]
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: 1061 DISPLAY DRIVER PCB. ASSY.

DRAWING NUMBER 400330 SHEET 2 OF 7

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R24	000272	2k7 5% ¼W CARBON	MULLARD	CR25	–
R25	000272	2k7 " " "	"	"	–
R26	000272	2k7 " " "	"	"	–
R27	000182	1k8 " " "	"	"	1
R28	000222	2k2 " " "	"	"	1
R29	000272	2k7 " " "	"	"	–
R30	000102	1k " " "	"	"	–
R31	000102	1k " " "	"	"	–
R32	000102	1k " " "	"	"	–
R33	000102	1k " " "	"	"	–
R34	000102	1k " " "	"	"	–
R35	000102	1k " " "	"	"	–
R36	000102	1k " " "	"	"	–
R37	000102	1k " " "	"	"	–
R38	000472	4k7 " " "	"	"	–
R39	000393	39k " " "	"	"	1
R40		NOT USED			–
R41	000563	56K 5% ¼W CARBON	MULLARD	CR25	1
C1	150020	10uF 20% 25v DIP TANT	UNION CARBIDE	K10E25	3
C2		NOT USED			–
C3		NOT USED			–

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD														

DATE	
DRAWN	
CHECKED	
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: 1061 DISPLAY DRIVER PCB. ASSY.

DRAWING NUMBER 400330 SHEET 3 OF 7

DESIGNATION	[illegible] No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
C4	110013	0·1μF 20% 25v POLYESTER	MULLARD	C280AE/P100K	8
C5	110013	" " " "	"	"	-
C6	110013	" " " "	"	"	-
C7	110013	" " " "	"	"	-
C8	110013	" " " "	"	"	-
C9	110013	" " " "	"	"	-
C10	110013	" " " "	"	"	-
C11	110013	" " " "	"	"	-
C12		NOT USED			-
C13	110005	0·01μF 20% 250v "	"	C280AE/P10K	3
C14	150020	10μF 20% 25v. DIP. TANT	UNION CARBIDE	K10E25	-
C15	110005	0·01μF 20% 250v POLYESTER	MULLARD	C280AE/P10K	-
C16	110005	0·01μF 20% 250v POLYESTER	MULLARD	C280AE/P10K	-
C17	150020	10μF 20% 25v DIP. TANT	UNION CARBIDE	K10E25	-
C18	180019	10μF 20% 250v AL ELECT	I.T.T.	JF10-1006 250AA	1
D1		NOT USED			-
D2		NOT USED			-
D3		NOT USED			-
D4	200001	DIODE Si GP	FAIRCHILD	IN4148	8
D5	200001	" " "	"	"	-
D6	200001	" " "	"	"	-

datron [illegible]

1061 DISPLAY DRIVER PCB. ASSY

[illegible] 400330 4 7

DESIGNATION	[illegible] No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
D7	200001	DIODE Si GP	FAIRCHILD	IN4148	-
D8	200001	" " "	"	"	-
D9	200001	" " "	"	"	-
D10	200001	" " "	"	"	-
D11	200001	" " "	"	"	-
D12	213005	DIODE ZENER 7.5V. ½W	MOTOROLA	BZX79C7V5	1
Q1	250009	Si PNP TRANSISTOR	NATIONAL	2N5401	11
Q2	250009	" " "	"	"	-
Q3	250009	" " "	"	"	-
Q4		NOT USED			-
Q5	240009	Si NPN TRANSISTOR	"	MPS L01	8
Q6	240009	" " "	"	"	-
Q7	240009	" " "	"	"	-
Q8	240009	" " "	"	"	-
Q9	240009	" " "	"	"	-
Q10	240009	" " "	"	"	-
Q11	240009	" " "	"	"	-
Q12	240009	" " "	"	"	-
Q13	250009	" PNP "	"	2N5401	-
Q14	250009	" " "	"	"	-
Q15	250009	" " "	"	"	-
Q16	250009	" " "	"	"	-

NOTES:

DATE	datron ELECTRONICS LTD	
DRAWN	TITLE	1061 DISPLAY DRIVER PCB. ASSY.
CHECKED		
APPROVED		
DATE	DRAWING NUMBER	400330 S SHEET 7 OF 7

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
Q17	250009	Si PNP TRANSISTOR	NATIONAL	2N5401	–
Q18	250009	" " "	"	"	–
Q19	250009	" " "	"	"	–
Q20	250009	" " "	"	"	–
M1	280062	128 × 8 BIT STATIC RAM	MOTOROLA	MC6810	1
M2		NOT USED			–
M3		NOT USED			–
M4	280023	QUAD 2 I/P NOR GATE	"	MC14001BCP	2
M5	280023	QUAD 2 I/P NOR GATE	"	"	–
M6	280024	TRI-STATE HEX NON-INV BUFFER	"	MC14503BCP	2
M7	280024	" " " " "	"	"	–
M8	280059	DUAL BINARY UP COUNTER	"	MC14520BCP	1
M9	270045	QUAD 2-1 DATA SELECT LS TTL	NATIONAL	SN74LS157	1
M10		NOT USED			–
M11	280043	4-BIT LATCH/4TO16 LINE DECODER	MOTOROLA	MC14515BCP	1
M12	270048	QUAD 2 I/P NAND LS TTL	NATIONAL	SN74LS00	1
M13	280077	HEX GATE	MOTOROLA	MC14572	1
AN2-AN4	090065	330K×7. 2% RESISTOR NETWORK	BECKMAN	764-1-R330K	3

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD														

DATE	datron ELECTRONICS LTD
DRAWN	TITLE 1061 DISPLAY DRIVER PCB. ASSY
CHECKED	
APPROVED	
DATE	DRAWING NUMBER 400330 SHEET 6 OF 7

JW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
J1	605002	16 WAY DIL LOW PROFILE SKT.	JERMYN OR ANTIFERENCE	A23-7001/X OR ICN-163-S3	1
J2	605064	24 WAY DIL SKT. TIN PLATE	AUGAT	324-AG39D	3
	605037	14 WAY DIL SOCKET	ASTRALUX OR JERMYN	ICL143-S3T	3
	605038	16 WAY DIL SOCKET	" "	ICL163-S6T	5
	605064	24 WAY DIL SKT. TIN PLATE	AUGAT	324-AG39D	–
TP1-TP6	540002	22 SWG BTC WIRE			A/R
	590004	SLEEVE – PTFE	HELLERMANN ELECTRIC	FE10	A/R
	410097-EA	PCB			1
	617010	NYLATCH – PLUNGER	ORDER FROM C.J. FOX & SONS	HN3P-32-4-1	4
	617011	NYLATCH – GROMMET	" " " "	HN3G-32-1	4
	606005	CLIP FOR SOCKET 605002	ANTIFERENCE	RC-74	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD														

DATE	datron ELECTRONICS LTD
DRAWN	TITLE 1061 DISPLAY DRIVER PCB. ASSY.
CHECKED	
APPROVED	
DATE	DRAWING NUMBER 400330 SHEET 7 OF 7

JW 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
R1		NOT USED			
R2	090001	PTC THERMISTOR	MULLARD	VA8650	2
R3	090044	4M0 1% MF	ACI		(1 SET) R3 R4
R4		3K94 1% MF	ACI		–
R5	000106	10M 5% ¼W CARBON	MULLARD	CR25	5
R6	000392	3K9 " " "	"	"	2
R7	000106	10M " " "	"	"	–
R8	019761	9K76 1% 50ppm M.F.	HOLCO	HB	1
R9	090001	PTC. THERMISTOR	MULLARD	VA8650	–
R10		NOT USED			–
R11	000106	10M 5% ¼W CARBON	MULLARD	CR25	–
R12	000563	56K " " "	"	"	2
R13	000563	56K " " "	"	"	–
R14	000104	100K " " "	"	"	6
R15	000243	24K " " "	"	"	1
R16	000682	6K8 " " "	"	"	1
R17	000103	10K " " "	"	"	3
R18	000107	100M " " "	"	"	1
R19	000104	100K " " "	"	"	–
R20	041505	15M 1% 100ppm CF	ALLEN BRADLEY	CC	2
R21	041505	15M " " "	"	"	–
R22	000222	2K2 5% ¼W CARBON	MULLARD	CR25	2
R23	000391	390R " " "	"	"	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS	1	2	3	4	5	6	7	8	9	10	11	12
ECO	RELEASED	EC0840	EC0857	895/909	933, 930	960 972 987	1000 1028	1054 1062	1109	1115, 1124	1134	1176
DATE	5-12-78	27-2-79	4.5.79	20-6-79	13-7-79	25-10-79	3-1-80	6 FEB 80	18.4.80	3.6.80	20.6.80	12.12.80
CHKD		MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD

DATE 10-10-78
DRAWN B.J.
CHECKED D C
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 OHMS PCB ASSY

DRAWING NUMBER 400331

SHEET 2 OF 12

J.W 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
R24	070003	57K77 0·1% WIREWOUND.	MANN		1
R25	070004	577K7 0·1% WIREWOUND.	MANN		1
R26	063204	200k POT CERMET	BECKMANN	72 P	2
R27	063204	200K " "	"	"	–
R28	000105	1M 5% ¼W CARBON	MULLARD	CR25	4
R29	070002	5K777 0·1% WIREWOUND	MANN		1
R30	070091	1K2839 0·1% WIREWOUND	MANN		2
R31	070091	1K2839 0·1% "	"		–
R32	000332	3K3 5% ¼W CARBON	MULLARD	CR25	1
R33	000154	150K 5% ¼W CARBON	MULLARD	CR25	1
R34	000681	680R " " "		"	1
R35	000106	10M 5% ¼W CARBON	MULLARD	CR25	–
R36	041005	10M 1% 100ppm CF	ALLEN BRADLEY	CC	1
R37	090049	18M MATCHED PAIR	HOLCO		1 PAIR
R38		8M			–
R39		F.S.V			–
R40		F.S.V			–
R41	000473	47K 5% ¼W CARBON	MULLARD	CR25	3
R42	000624	620K " " "	"	"	1
R43	000473	47K " " "	"	"	–
R44	000102	1K " " "	"	"	2
R45	000102	1K " " "	"	"	–
R46	000562	5K6 " " "	"	"	2

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS												
ECO												
DATE												
CHKD												

DATE 10-10-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 OHMS P.C.B ASSY.

DRAWING NUMBER 400331

SHEET 3 OF 12

J.W 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy
R47	000473	47K 5% ¼W CARBON	MULLARD	CR25	–
R48	000823	82K " " "	"	"	2
R49	000392	3K9 " " "	"	"	–
R50	000562	5K6 " " "	"	"	–
R51	000105	1M " " "	"	"	–
R52	000104	100K " " "	"	"	–
R53	000273	27K " " "	"	"	2
R54	000104	100K " " "	"	"	–
R55	000105	1M " " "	"	"	–
R56	000824	820K " " "	"	"	1
R57	000104	100K " " "	"	"	–
R58	000273	27K " " "	"	"	–
R59	000104	100K " " "	"	"	–
RG0	000123	12K " " "	"	"	1
RG1	000334	330K " " "	"	"	1
RG2	000222	2K2 " " "	"	"	–
RG3	000223	22K " " "	"	"	1
RG4	000333	33K " " "	"	"	2
RG5	000272	2K7 " " "	"	"	1
RG6	000105	1M " " "	"	"	–
RG7	000474	470K " " "	"	"	1
RG8	000124	120K " " "	"	"	1
R69	000103	10k " " "	"	"	–

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS								
ECO								
DATE								
CHKD								

DATE 10-10-78
DRAWN B J
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 OHMS PC.B ASSY

DRAWING NUMBER 400331

SHEET 4 OF 12

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
R70	000221	220R 5% ¼W CARBON	MULLARD	CR25	1
R71	000103	10k 5% ¼W CARBON	MULLARD	CR25	–
R72	000333	33k 5% ¼W CARBON	MULLARD	CR25	—
R73	000823	82k 5% ¼W CARBON	MULLARD	CR25	—
R74	000106	10M 5% ¼W CARBON	MULLARD	CR25	—
AN1	090017	100k x 7 2% NETWORK	BECKMAN	764-1-R100k	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS								
ECO								
DATE								
CHKD								

DATE 3.6.80
DRAWN
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 OHMS PCB. ASSY.

DRAWING NUMBER 400331

SHEET 5 OF 12

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
C1	120028	4700pF 20% 100V POLYCARB	WIMA	FKC-2 MIN	1
C2	120026	680pF 20% 100V POLYCARB	WIMA	FKC-2 MIN	1
C3	102470	47pF 500V CER DISC	ERIE	801	2
C4	102470	47pF 500V CER DISC	ERIE	801	–
C5	102222	2n2F 500V CER DISC	ERIE	801	1
C6	101103	·01μF 250V CER DISC	ERIE	801	4
C7	120022	1nSF 20% 100V POLYCARB	WIMA	FKC2 MIN	1
C8	120014	2·2μF 10% 63V POLYCARB	ASHCROFT	A2B2221B	2
C9	120014	2·2μF " " "		"	–
C10	110013	0·1μF 10% 250V POLYESTER	MULLARD	C280AE/P100K	2
C11	150001	22μF 20% 16V DIP TANT	UNION CARBIDE	K22E16	2
C12	101103	·01μF 250V CER DISC	ERIE	801	–
C13	150001	22μF 20% 16V DIP TANT	UNION CARBIDE	K22E16	–
C14	101103	·01μF 250V CER DISC	ERIE	801	–
C15	102100	10pF 500V CER DISC		"	2
C16	102100	10pF " " "		"	–
C17	102102	1nF " " "			1
C18	120021	0·47μF 10% 63V POLYCARB	ASHCROFT	A2B4711B	1
C19	150014	680nF 20% 35V DIP TANT	UNION CARBIDE	KR68E35	1
C20	150016	1μF 20% 35V DIP TANT	UNION CARBIDE	K1R0E35	1
C21	150020	10μF 20% 25V DIP TANT	UNION CARBIDE	K10E25	2
C22	101103	·01μF 250V CER DISC	ERIE	801	–
C23	150020	10μF 20% 25V DIP TANT	UNION CARBIDE	K10E25	–

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE 10-10-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 OHMS PCB ASSY

DRAWING NUMBER 400331

SHEET 6 OF 12

JW 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
C24	102101	100pf 10% 500V Cer Disc	I.T.T	CD10	3
C25	102101	100pf " " " "	"	"	–
C26	102101	100pF " " " "	"	"	–
C27	110013	100nF 20% 250v POLYESTER	MULLARD	C280AE/P100k	–
D1	213001	10V 5W ZENER	MOTOROLA	1N5347	4
D2	213001	10V " "		"	–
D3		NOT USED			
D4		NOT USED			
D5		NOT USED			
D6		NOT USED			
D7	210027	2V7 400mW ZENER	MULLARD	BZY88C2V7	1
D8	200001	Si G P.	FAIRCHILD	1N4148	11
D9		NOT USED			
D10	213001	10V 5W ZENER	MOTOROLA	1N5347	–
D11	213001	10V " "	"	"	–
D12	200001	Si G P.	FAIRCHILD	1N4148	–
D13		NOT USED			
D14	200008	Si LOW LEAKAGE	FAIRCHILD	1N458A	3
D15	200008	Si " "	"	"	–
D16	210075	7V5 400mW ZENER	MULLARD	BZY88C7V5	1
D17	210120	12V 400mW ZENER	"	BZY88C12	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE 10-10-78
DRAWN B.J.
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 OHMS PCB ASSY.

DRAWING NUMBER 400331

SHEET 7 OF 12

JW 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
D18	200001	Si G P	FAIRCHILD	IN4148	-
D19	200001	Si "	"	"	-
D20	200001	Si "	"	"	-
D21	200001	Si "	"	"	-
D22	200001	Si "	"	"	-
D23	200001	Si "	"	"	-
D24		NOT USED			
D25	200001	Si "	"	"	-
D26	200001	Si "	"	"	-
D27	200001	Si GP	"	"	-
D28	200008	Si. Low Leakage	"	IN458A	-
Q1	230027	N-CHAN J FET SELECTED	TELEDYNE	U3114E	7
Q2	230027	" " "	"	"	-
Q3	230027	" " "	"	"	-
Q4	230027	" " "	"	"	-
Q5	230002	N-CHAN J FET	SILICONIX	U1994E	6
Q6	230027	N-CHAN J FET SELECTED	TELEDYNE	U3114E	-
Q7	230027	" " "	"	"	-
Q8	230002	N-CHAN J FET	SILICONIX	U1894E	-
Q9	230002	" "	"	"	-
Q10	240017	Si NPN SUPERMATCH PAIR	NATIONAL	LM394	1
Q11	230029	N-CHAN J FET	SILICONIX	J309	4

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE	10-10-78
DRAWN	B.J.
CHECKED	
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: 1061 OHMS P.C.B. ASSY.

DRAWING NUMBER: 400351

SHEET 8 OF 12

JW 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
Q12		NOT USED			
Q13	240012	Si NPN	NATIONAL	2N3053	1
Q14	230027	N-CHAN J FET	TELEDYNE	U3114E	-
Q15	250001	Si PNP	NATIONAL	BC214	2
Q16	250011	Si PNP	NATIONAL	BC327	1
Q17	240001	Si NPN	NATIONAL	BC184	2
Q18	240001	Si NPN	NATIONAL	BC184	-
Q19	250001	Si PNP	NATIONAL	BC214	-
Q20	230002	N-CHAN J FET	SILICONIX	U1994E	-
Q21	230029	N-CHAN J FET.	SILICONIX	J309	-
Q22	230029	N-CHAN J FET.	SILICONIX	J309	-
Q23	230002	" "	"	U1994E	-
Q24	230002	" "	"	"	-
Q25	230029	" "	"	J309	-

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE	10-10-78
DRAWN	B.J.
CHECKED	
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: 1061 OHMS P.C.B. ASSY

DRAWING NUMBER: 400831

SHEET 9 OF 12

JW 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
M1	280022	QUAD BILATERIAL SWITCH	MOTOROLA	MC 14016 BCP	2
M2	280022	" " "	"	"	–
M3	260022	OP AMP	NATIONAL	LF 355	1
M4	260026	OP AMP	NATIONAL	LM212	1
M5	280025	QUAD ANALOGUE SWITCH	MOTOROLA	MC 14066 BCP	1
M6	280072	M'STABLE /ASTABLE M'VIBR	R.C.A	CD 4047 AE	1
M7	280015	QUAD LATCH	MOTOROLA	MC 14076 BCP	2
M8	280015	" "	"	"	–
M9	280011	DUAL D FLIP FLOP	MOTOROLA	MC 14013 BCP	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS	
ECO	
DATE	
CHKD	

DATE	6-12-78
DRAWN	B. J
CHECKED	
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: 1061 OHMS PCB ASSY

DRAWING NUMBER: 400331

SHEET: 10 OF 12

JW 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
RL1 (1)	330001	RELAY 4P 2W CROSSBAR	P&B	RIO-E1-L4-Q2·5K	1
	400379/2	WIRE / TERMINAL ASSY			6
	410099-6	OHMS P.C.B			1
	459112	RELAY BRACKET	KDP		1
	540008	7/0·2 PTFE INSULATED WHITE.		TYPE C	280mm.
	540002	22 SWG TINNED COPPER WIRE			A/R
	590001	SLEEVE MAX CABLE Ø 3 0	HELLERMANN ELECTRIC	H15 x 20mm BLK HELSYN	9
	590055	SLEEVE Ø1·0 SIL. RUBBER	HELLERMANN ELECTRIC	H15 CONT. BLACK	20mm
	571110/8	16 WAY RIBBON CABLE ASSY.	3M		1
	602001	FSV TERMINAL	MOLEX	02-04-1875	4
	605002	16 WAY DIL LOW PROFILE SKT	JERMYN or ANTIFERENCE	A23-2001/Y or ICN-163-33	1
	605060	14 WAY DIL SOCKET	ASTRALUX	ICL-143-33T	5
	605061	16 WAY DIL SOCKET	ASTRALUX	ICL-163-66T	2
J1	605053	12 WAY POLARISED SOCKET	MOLEX	22-01-2125	1

NOTES (1) ALTERNATIVE RELAY 330016 (OMRON) — USE M2·3 FULL HEX. NUT 615014. (CHALLENGE IND. FASTENERS).

SEE SHEET 2 FOR LATEST ISSUE

ISS	
ECO	
DATE	
CHKD	

DATE	10-10-78
DRAWN	B J
CHECKED	
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: 1061 OHMS PCB ASSY

DRAWING NUMBER: 400331

SHEET: 11 OF 12

JW 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy
	606005	CLIP FOR 605002	ANTIFERENCE	RC-71	1
	611004	SCREW M3x6mm STEEL POZIPAN ZINC PLATED	GKN		1
	613005	WASHER M3 INT/SHAKEPROOF	GKN DISTRIBUTORS	ZINC PLATED	2
	615002	NUT M3 FULL HEX STEEL		ZINC PLATED	1
	615005	NUT 3-48 UNC FULL HEX	STEEL	" "	1
	617010	NYLATCH PLUNGER HN3P	ORDER FROM C J FOX & SONS	HN3P-32-4-1	4
	617011	NYLATCH GROMMET HN3G		HN3G-32-1	4
	618002	TO5 MOUNTING PAD	JERMYN	TO518-004D	1
	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	8
	630024	STANDARD STEATITE INSUL BEAD	PARK ROYAL PORCELAIN CO	TYPE No 2 (16 SWG)	8

NOTES

SEE SHEET 2 FOR LATEST ISSUE

IBS															
ECO															
DATE															
CHKD															

DATE 10-10-78	datron ELECTRONICS LTD
DRAWN B.J.	TITLE 1061 OHMS PCB ASSY
CHECKED	
APPROVED	
DATE	DRAWING NUMBER 400331 — SHEET 12 OF 12

JW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
R1	000103	10k 5% ¼W CARBON	MULLARD	CR25	1
R2	000104	100k 5% ¼W CARBON	MULLARD	CR25	4
R3	000104	100k 5% ¼W CARBON	MULLARD	CR25	–
R4	000104	100k 5% ¼W CARBON	MULLARD	CR25	–
R5	000104	100k 5% ¼W CARBON	MULLARD	CR25	–
AN1	090017	100k x 7 2% NETWORK	BECKMAN	764-1-R100k	2
AN2	090017	100k x 7 2% NETWORK	BECKMAN	764-1-R100k	–
C1	150002	10μF 20% 16 V DIP. TANT.	UNION CARBIDE	K10E16	1
C2	150005	2μ2F 20% 16V DIP. TANT.	UNION CARBIDE	K2R2E16	1
C3	150008	470nF 20% 35V DIP. TANT.	UNION CARBIDE	KR47E35	1
C4	110005	10nF 20% 250v POLYESTER	MULLARD	C280AE P10K	1
C5	150016	1μF 20% 35V DIP. TANT.	UNION CARBIDE	K1R0E35	5
C6	150016	1μF 20% 35V DIP. TANT.	UNION CARBIDE	K1R0E35	–
C7	150016	1μF 20% 35V DIP. TANT.	UNION CARBIDE	K1R0E35	–
C8	150016	1μF 20% 35V DIP. TANT.	UNION CARBIDE	K1R0E35	–
C9	150016	1μF 20% 35V DIP. TANT.	UNION CARBIDE	K1R0E35	–

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS	1	2	3	4
ECO	RELEASED	1078	1093	1137
DATE	1.2.80	22.2.80	26.3.80	28.7.80
CHKD	MD	A.J.	A.J.	AP

DATE	1.2.80
DRAWN	IL
CHECKED	MD
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE 1061 BCD/PROG. PCB. ASSY.

DRAWING NUMBER 400332 SHEET 2 OF 4

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy
D1	200001	75mA 75V GP. Si. DIODE	FAIRCHILD	IN4148	1
M1	280081	PERIPHERAL INTERFACE ADAPTOR	MOTOROLA	MC68A21P, L	1
M2	290003	555 TIMER	FAIRCHILD	μA555TC	1
M3	270050	HEX INVERTOR LS	NATIONAL	DM74LS04N	2
M4	270048	QUAD 2 I/P NAND LS	NATIONAL	DM74LS00N	1
M5	270051	DUAL 4 I/P AND LS	NATIONAL	DM74LS21N	1
M6	270050	HEX INVERTOR LS	NATIONAL	DM74LS04N	–
M7	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076BCP	9
M8	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076BCP	–
M9	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076BCP	–
M10	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076BCP	–
M11	290080-9	2716 EPROM PROGRAMMED	DATRON	IB2716(290080-1SS)	1
M12	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076BCP	–
M13	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076BCP	–
M14	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076BCP	–
M15	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076BCP	–
M16	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076BCP	–
M17	280024	TRI-STATE HEX. BUFFER	MOTOROLA	MC14503BCP	9
M18	280024	TRI-STATE HEX. BUFFER	MOTOROLA	MC14503BCP	–
M19	280024	TRI-STATE HEX. BUFFER	MOTOROLA	MC14503BCP	–
M20	280024	TRI-STATE HEX. BUFFER	MOTOROLA	MC14503BCP	–
M21	280024	TRI-STATE HEX. BUFFER	MOTOROLA	MC14503BCP	–

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS													
ECO													
DATE													
CHKD													

DATE	1.2.80
DRAWN	IL
CHECKED	
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE 1061 BCD/PROG. PCB. ASSY.

DRAWING NUMBER 400332 SHEET 3 OF 4

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M22	280066	256 x 4 BIT STATIC CMOS RAM	SEE DRAWING		2
M23	280066	256 X 4 BIT STATIC CMOS RAM	SEE DRAWING		-
M24	280024	TRI-STATE HEX. BUFFER	MOTOROLA	MC14503 BCP	-
M25	280024	TRI-STATE HEX. BUFFER	MOTOROLA	MC14503 BCP	-
M26	280024	TRI-STATE HEX. BUFFER	MOTOROLA	MC14503 BCP	-
M27	280024	TRI-STATE HEX. BUFFER	MOTOROLA	MC14503 BCP	-
TP's	540002	22 SWG BTC WIRE			A/R
J3	605051	4 WAY POLARISED SOCKET	MOLEX	(22-01-2045) 6471-4-1	1
J1	605064	24 WAY DIL. SOCKET	AUGAT	324-AG39D	4
J2	605064	24 WAY DIL. SOCKET	AUGAT	324-AG39D	-
	605037	14 WAY DIL. SOCKET	ASTRALUX OR JERMYN	ICL143 S3T	4
	605038	16 WAY DIL. SOCKET	ASTRALUX OR JERMYN	ICL163-S6T	18
J5	605064	24 WAY DIL. SOCKET	AUGAT	324-AG39D	-
	605050	40 WAY DIL. SOCKET	AUGAT	340-AG39D	1
	605059	8 WAY DIL. SOCKET	ASTRALUX	ICL-083-S6T	1
	605063	22 WAY DIL. SOCKET	AUGAT	322-AG39D	2
J4	605002	16 WAY DIL. SOCKET	ASTRALUX	ICN-163-S3G	1
	606005	SOCKET CLIP	ASTRALUX	RC-74	1
	617010	NYLATCH PLUNGER HN3P	ORDER FROM C.J.FOX & SONS	HN3P-32-4-1	6
	617011	NYLATCH GROMMET HN3G	ORDER FROM C.J. FOX & SONS	HN3G-32-1	6
	400379/1	WIRE/TERMINAL ASSY			3
	410100-4	PCB			1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS					
ECO					
DATE					
CHKD					

DATE 1.2.80
DRAWN
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE 1061 BCD/PROG. PCB. ASSY.

DRAWING NUMBER 400332

SHEET 4 OF 4

J W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy
R1	000123	12K 5% ¼W CARBON	MULLARD	CR25	2
R2		NOT USED			—
R3	000332	3K3 5% ¼W CARBON.	MULLARD	CR25	3
R4		NOT USED			—
R5	000123	12K 5% ¼W. CARBON.	MULLARD	CR25	—
R6	000222	2K2 5% ¼W CARBON.	MULLARD	CR25	1
R7		NOT USED			—
R8		NOT USED			—
R9		NOT USED.			—
R10	000562	5K6 5% ¼W CARBON	MULLARD	CR25	1
R11	000183	18K 5% ¼W CARBON	MULLARD	CR25	1
R12	000105	1M 5% ¼W CARBON.	MULLARD	CR25	1
R13		NOT USED			—
R14	000103	10k 5% ¼W CARBON	MULLARD	CR25	2
R15		NOT USED			—
R16	000332	3k3 5% ¼W CARBON	MULLARD	CR25	—
R17		NOT USED			—
R18	000681	680R 5% ¼W CARBON	MULLARD	CR25	1
R19	000332	3k3 5% ¼W CARBON	MULLARD	CR25	—
R20	000103	10k 5% ¼W CARBON	MULLARD	CR25	—

NOTES

SEE SHEET 3 FOR LATEST ISSUE

ISS	A	1	2 C	3	4	5	6	7
ECO		REL TO PROD 372/395		981	1034	1085	1167	1199
DATE	9 MAY 79	17 MAY 79	25 OCT 79	6 NOV 79	2 JAN 80	22.4.80	23.9.80	24.2.81
CHKD			MD	MD	MD	MD	MD	MD

DATE 9 MAY 79
DRAWN W.G.SMITH
CHECKED MD
APPROVED
DATE 17 MAY 79

datron ELECTRONICS LTD

TITLE REAR INPUT ASSY. 1061/71

DRAWING NUMBER 400386

SHEET 3 OF 8.

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
C1	150022	2µ2F. 20% 35v. DIP TANT.	UNION CARBIDE	K2R2E35	1
C2		NOT USED			—
C3		NOT USED			—
C4	150007	6µ8F 20% 16V. DIP TANT.	UNION CARBIDE	K6R8E16	1
C5	102101	100pF 10% 500v. CER. DISC	ITT	CD10	1
C6	110013	100nF 20% 250v. POLYESTER	MULLARD	C280AEP100K	1

NOTES

SEE SHEET 3 FOR LATEST ISSUE

ISS	
ECO	
DATE	
CHKD	

DATE 23.9.80
DRAWN IL
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE REAR INPUT ASSY 1061/1071

DRAWING NUMBER 400386

SHEET 4 OF 8

J.W 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
D1	200001	75mA. 75V GP Si DIODE	FAIRCHILD	IN4148	5
D2		NOT USED			–
D3	200001	75mA. 75V GP Si DIODE	FAIRCHILD	IN4148	–
D4		NOT USED			–
D5	200001	75mA. 75V GP Si DIODE	FAIRCHILD	IN4148	–
D6	200001	75mA 75V GP Si DIODE	FAIRCHILD	IN4148	–
D7	200001	75mA 75V GP Si DIODE	FAIRCHILD	IN4148	–
Q1	240001	Si NPN TRANSISTOR	NATIONAL	BC184/TO18	2
Q2		NOT USED			–
Q3	250001	Si PNP TRANSISTOR	NATIONAL	BC214/TO18	1
Q4		NOT USED.			–
Q5		NOT USED			–
Q6	240001	Si NPN TRANSISTOR	NATIONAL	BC184/TO18	–
M1	280011	DUAL D FLIP-FLOP	MOTOROLA	MC14013 BCP	1
J1	604036	CON. PIN STRIP OF 10 HORIZ TYPE	AMP	163740-8	2
J2, J3	605052	8WAY POLARISED SOCKET	MOLEX	(22-01-2085) 6471-8-1	2

NOTES

SEE SHEET 3 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE 9 MAY 79
DRAWN W.G.SMITH
CHECKED MOD
APPROVED
DATE 17 MAY 79

datron ELECTRONICS LTD

TITLE REAR INPUT ASSY. 1061/71

DRAWING NUMBER 400386 SHEET 5 OF 8

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
J4 & J6	604033	FLAT WAFER PIN (4 WAY GOLD)	MOLEX	22-27-2041/GOLD	3
J5	605051	4WAY POLARISED SOCKET	MOLEX	22-01-2045	1
	400379/4	WIRE/TERMINAL ASSY	HOLDEN CORDS		6
	400379/3	WIRE/TERMINAL ASSY	HOLDEN CORDS		4
RL1 (1)	330003	RELAY 2P2W CROSSBAR	P & B	RIO-E1-L2-Q5-BK(25207)	1
RL2 (11)	330001	RELAY 4P2W CROSSBAR	P & B	RIO-E1-L4-Q2-5K	1
RL3 & RL4		NOT USED.			
	410106-5	COMPONENT P.C.B			1
	410132-4	RELAY P.C.B.			1
	450257-1	SOCKET PLATE			1
	450241-1	RELAY BRACKET			1
	540002	22SWG TINNED COPPER WIRE			A/R
	540008	7/2 PTFE INS. WHITE WIRE			140mm

NOTES (1) ALTERNATIVE RELAY 330015(OMRON) — USE M2·3 FULL HEX NUT. 61S014 (CHALLENGE IND. FASTENERS) 2 OFF.
(11) ALTERNATIVE RELAY 330016(OMRON)

SEE SHEET 3 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE 9 MAY 79
DRAWN W.G.SMITH
CHECKED MOD
APPROVED
DATE 17 MAY 79

datron ELECTRONICS LTD

TITLE REAR INPUT ASSY 1061/71

DRAWING NUMBER 400386 SHEET 6 OF 8

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No. USED Per Assy.
	590001	SLEEVE. MAX CABLE Ø 3.0MM	HELLERMAN ELECTRIC	H15×20MM BLK HELSYN	17
	590004	SLEEVE — PTFE	HELLERMAN ELECTRIC	FE10	30MM.
J11	604008	7 WAY PLUG PANEL MTG	PYE CONNECTORS	M7P	1
	605009	7 WAY SOCKET	PYE CONNECTORS	M7S	1
	605057	CRIMP TERMINAL	MOLEX	4809-GL	2
	606001	LOCKING HOOD	PYE CONNECTORS	MHN	1
	606002	NUT	PYE CONNECTORS	MN	1
	606003	WASHER	PYE CONNECTORS	MLW	1
	605060	14 WAY DIL SOCKET	ASTRALUX OR JERMYN	ICN-246-54T OR A23-2023Y	1
	611004	SCREW M3×6MM STEEL POSI-PAN	G.K.N	ZINC PLATED	7.
	611007	SCREW M3×6MM STEEL POSI-CSK	G.K.N	ZINC PLATED	7.
	611016	SCREW M3×8MM STEEL POSI-PAN	G.K.N	ZINC PLATED.	4.
	612020	STAND-OFF NYLON M3×10 TRANSPILLAR	W.K. ELECTRONICS.	TPI/G5/10/M3/I/I	5

NOTES

SEE SHEET 3 FOR LATEST ISSUE

| ISS | | |

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R1	090054	8k2 ·25% 10ppm MF	ACI	SEE DRG	1
R2	011181	1k18 1% 1/8W 50ppm MF	HOLCO	H8C	1
R3	015900	590R 1% 1/8W 50ppm MF	HOLCO	H8C	1
R4	012940	294R 1% 1/8W 50ppm MF	HOLCO	H8C	1
R5	011470	147R 1% 1/8W 50ppm MF	HOLCO	H8C	1
R6	090054	16k ·25% 10ppm MF	ACI	SEE DRG	–
R7 *	000434	430k 5% 1/4W CARBON	MULLARD	CR25	1
R8	000394	390k 5% 1/4W CARBON	MULLARD	CR25	1
R9	000103	10k 5% 1/4W CARBON	MULLARD	CR25	5
R10	000155	1M5 5% 1/4W CARBON	MULLARD	CR25	1
R11	000105	1M 5% 1/4W CARBON	MULLARD	CR25	5
R12	000152	1K5 5% 1/4W CARBON	MULLARD	CR25	1
R13	000224	220k 5% 1/4W CARBON	MULLARD	CR25	1
R14	000333	33k 5% 1/4W CARBON	MULLARD	CR25	3
R15	000104	100k 5% 1/4W CARBON	MULLARD	CR25	7
R16	000685	6M8 5% 1/4W CARBON	MULLARD	CR25	1
R17	000332	3k3 5% 1/4W CARBON	MULLARD	CR25	5
R18	090053	100k ·25% 10ppm MF	ACI	SEE DRG	1
R19	090053	100k ·25% 10ppm MF	ACI	SEE DRG	–
R20		FSV (220k NOM)	MULLARD	CR25	1
R21	000821	820R 5% 1/4W CARBON	MULLARD	CR25	1
R22	290026	RMS KIT	DATRON	SEE DRG	1
R23	000270	27R 5% 1/4W CARBON	MULLARD	CR25	1

NOTES * NOT USED ON ASSEMBLIES FITTED INTO 1061's

SEE SHEET 2 FOR LATEST ISSUE

ISS	11	12	13	14	15
E.C.O.	1133	1160	1190	1201 . 1207	1217
DATE	13.6.80	29.9.80	5.1.81	6.4.81	19·8·81
CHKD	MD	MD	MD	MD	MD

DATE	17.8.79
DRAWN	IL
CHECKED	RJW
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: AC PCB ASSY

DRAWING NUMBER: 400402 SHEET 2 OF 17

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy
R24	000107	100M 10% 1/4W CARBON	ALLEN BRADLEY	CB10	4
R25	000331	330R 5% 1/4W CARBON	MULLARD	CR25	2
R26	000154	150k 5% 1/4W CARBON	MULLARD	CR25	1
R27	000334	330k 5% 1/4W CARBON	MULLARD	CR25	1
R28	290026	RMS KIT	DATRON	SEE DRG	–
R29	000221	220R 5% 1/4W CARBON	MULLARD	CR25	5
R30	000680	68R 5% 1/4W CARBON	MULLARD	CR25	3
R31	000561	560R 5% 1/4W CARBON	MULLARD	CR25	2
R32	000182	1K8 5% 1/4W CARBON	MULLARD	CR25	2
R33	000333	33k 5% 1/4W CARBON	MULLARD	CR25	–
R34	000103	10k 5% 1/4W CARBON	MULLARD	CR25	–
R35	063500	50R POT 3/8"SQ. CERMET	BECKMAN	72P	2
R36	000125	1M2 5% 1/4W CARBON	MULLARD	CR25	1
R37	000222	2k2 5% 1/4W CARBON	MULLARD	CR25	5
R38	000124	120k 5% 1/4W CARBON	MULLARD	CR25	2
R39	000104	100k 5% 1/4W CARBON	MULLARD	CR25	–
R40	000103	10k 5% 1/4W CARBON	MULLARD	CR25	–
R41	000332	3k3 5% 1/4W CARBON	MULLARD	CR25	–
R42	000332	3k3 5% 1/4W CARBON	MULLARD	CR25	–
R43	000332	3k3 5% 1/4W CARBON	MULLARD	CR25	–
R44	000331	330R 5% 1/4W CARBON	MULLARD	CR25	–
R45	000680	68R 5% 1/4W CARBON	MULLARD	CR25	–
R46	000472	4k7 5% 1/4W CARBON	MULLARD	CR25	1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS													
E.C.O.													
DATE													
CHKD													

DATE	17.8.79
DRAWN	IL
CHECKED	RJW
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: AC PCB ASSY

DRAWING NUMBER: 400402 SHEET 3 OF 17

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R47	090051	4k7 ·25% 10ppm MF	ACI	SEE DRG	1
R48	090053	8k975·25% 10ppm MF	ACI	SEE DRG	—
R49	000912	9k1 5% ¼W CARBON	MULLARD	CR25	1
R50	063500	50R POT ⅜"sq. CERMET	BECKMAN	72P	—
R51	000107	100M 10% ¼W CARBON	ALLEN BRADLEY	CB10	—
R52	000122	1k2 5% ¼W CARBON	MULLARD	CR25	1
R53	000333	33k 5% ¼W CARBON	MULLARD	CR25	—
R54	000123	12K 5% ¼W CARBON	MULLARD	CR25	1
R55	000681	680R 5% ¼W CARBON	MULLARD	CR25	1
R56	000103	10k 5% ¼W CARBON	MULLARD	CR25	—
R57	000105	1M 5% ¼W CARBON	MULLARD	CR25	—
R58	000104	100k 5% ¼W CARBON	MULLARD	CR25	—
R59	000120	12R 5% ¼W CARBON	MULLARD	CR25	2
R60	000120	12R 5% ¼W CARBON	MULLARD	CR25	—
R61	000222	2k2 5% ¼W CARBON	MULLARD	CR25	—
R62	000332	3k3 5% ¼W CARBON	MULLARD	CR25	—
R63	000222	2k2 5% ¼W CARBON	MULLARD	CR25	—
R64	000222	2k2 5% ¼W CARBON	MULLARD	CR25	—
R65	000101	100R 5% ¼W CARBON	MULLARD	CR25	4
R66	000221	220R 5% ¼W CARBON	MULLARD	CR25	—
R67	000183	18k 5% ¼W CARBON	MULLARD	CR25	1
R68	090053	18k ·25% 10ppm MF	ACI	SEE DRG	—
R69	090051	4k7 ·25% 10ppm MF	ACI	SEE DRG	—

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD														

DATE 17.8.79
DRAWN IL
CHECKED RJW
APPROVED
DATE

datron ELECTRONICS LTD

TITLE AC PCB ASSY

DRAWING NUMBER 400402

SHEET 4 OF 17

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R70	000272	2K7 5% ¼W CARBON	MULLARD	CR25	2
R71	000272	2K7 5% ¼W CARBON	MULLARD	CR25	—
R72	000330	33R 5% ¼W CARBON	MULLARD	CR25	1
R73	000105	1M 5% ¼W CARBON	MULLARD	CR25	—
R74	000824	820k 5% ¼W CARBON	MULLARD	CR25	1
R75	063504	500k POT ⅜"sq CERMET	BECKMAN	72P	2
R76	090067	62kG ·25% 10ppm MF	ACI	SEE DRG	1
R77	000104	100k 5% ¼W CARBON	MULLARD	CR25	—
R78	000225	2M2 5% ¼W CARBON	MULLARD	CR25	2
R79	000124	120k 5% ¼W CARBON	MULLARD	CR25	—
R80	000561	560R 5% ¼W CARBON	MULLARD	CR25	—
R81	000101	100 R 5% ¼W CARBON	MULLARD	CR25	—
R82	000101	100R 5% ¼W CARBON	MULLARD	CR25	—
R83	000104	100k 5% ¼W CARBON	MULLARD	CR25	—
R84	000184	180k 5% ¼W CARBON	MULLARD	CR25	3
R85	000184	180k 5% ¼W CARBON	MULLARD	CR25	—
R86	000103	10k 5% ¼W CARBON	MULLARD	CR25	—
R87	000153	15k 5% ¼W CARBON	MULLARD	CR25	1
R88	000680	68R 5% ¼W CARBON	MULLARD	CR25	—
R89	000221	220R 5% ¼W CARBON	MULLARD	CR25	—
R90	063204	200k POT ⅜"sq. CERMET	BECKMAN	72P	1
R91	000105	1M 5% ¼W CARBON	MULLARD	CR25	—
R92	000105	1M 5% ¼W CARBON	MULLARD	CR25	—

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD														

DATE 17.8.79
DRAWN IL
CHECKED RJW
APPROVED
DATE .

datron ELECTRONICS LTD

TITLE AC PCB ASSY

DRAWING NUMBER 400402

SHEET 5 OF 17

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R93	000225	2M2 5% 1/4W CARBON	MULLARD	CR25	—
R94	000274	270k 5% 1/4W CARBON	MULLARD	CR25	1
R95	090052	9k ·25% 10ppm MF	ACI	SEE DRG	1
R96	090052	1k ·25% 10ppm MF	ACI	SEE DRG	—
R97	000101	100R 5% 1/4W CARBON	MULLARD	CR25	—
R98	000471	470R 5% 1/4W CARBON	MULLARD	CR25	2
R99	000182	1k8 5% 1/4W CARBON	MULLARD	CR25	—
R100	000184	180k 5% 1/4W CARBON	MULLARD	CR25	—
R101	000221	220R 5% 1/4W CARBON	MULLARD	CR25	—
R102	090067	62k6 ·25% 10ppm MF	ACI	SEE DRG	—
R103	000221	220R 5% 1/4W CARBON	MULLARD	CR25	—
R104	000163	16k 5% 1/4W CARBON	MULLARD	CR25	1
R105	000623	62k 5% 1/4W CARBON	MULLARD	CR25	1
R106	011001	1k00 1% 1/8W 50ppm MF	HOLCO	H8C	3
R107	011803	180k 1% 1/8W 50ppm MF	HOLCO	H8C	1
R108	042215	22M1 1% 1/2W 100ppm MF	ALLEN BRADLEY	CC	2
R109	090066	1k ·25% 10ppm MF	ACI	SEE DRG.	1
R110	090066	10k1 ·25% 10ppm MF	ACI	SEE DRG	—
R111	090066	111k ·25% 10ppm MF	ACI	SEE DRG	—
R112	063504	500k POT 3/8"SQ CERMET	BECKMAN	72P	—
R113	042215	22M1 1% 1/2W 100ppm MF	ALLEN BRADLEY	CC	—
R114	090066	1M ·25% 10ppm MF	ACI	SEE DRG	—
R115	000822	8k2 5% 1/4W CARBON	MULLARD	CR25	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE 17.8.79
DRAWN IL
CHECKED RLW
APPROVED
DATE

datron ELECTRONICS LTD

TITLE AC PCB ASSY

DRAWING NUMBER 400402

SHEET 6 OF 17

W 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
R116	000336	33M 10% 1/4W CARBON	ALLEN BRADLEY	CB10	1
R117	000102	1k 5% 1/4W CARBON	MULLARD	CR25	2
R118	000823	82k 5% 1/4W CARBON	MULLARD	CR25	1
R119	000107	100M 10% 1/4W CARBON	ALLEN BRADLEY	CB10	—
R120	000102	1k 5% 1/4W CARBON	MULLARD	CR25	—
R121	063105	1M POT 3/8" SQ CERMET	BECKMAN	72P	1
R122	000104	100k 5% 1/4W CARBON	MULLARD	CR25	—
R123	090066	277k ·25% 10ppm MF	ACI	SEE DRG	—
R124	090066	277k ·25% 10ppm MF	ACI	SEE DRG	—
R125	090066	277k ·25% 10ppm MF	ACI	SEE DRG	—
R126	090066	277k ·25% 10ppm MF	ACI	SEE DRG	—
R127	000107	100M 10% 1/4W CARBON	ALLEN BRADLEY	CB10	—
R128	000476	47M 10% 1/4W CARBON	ALLEN BRADLEY	CB10	1
R129	000222	2k2 5% 1/4W CARBON	MULLARD	CR25	—
R130	000471	470R 5% 1/4W CARBON	MULLARD	CR25	—
R131					
R132					
R133	011001	1k00 1% 1/8W 50ppm M/F	HOLCO	H8C	—
R134	011001	1k00 1% 1/8W 50ppm M/F	HOLCO	H8C	—
R135	000104	100k 5% 1/4W CARBON	MULLARD	CR25	—
R136	000273	27k 5% 1/4W CARBON	MULLARD	CR25	1

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE 17.8.79
DRAWN IL
CHECKED RLW
APPROVED
DATE

datron ELECTRONICS LTD

TITLE AC PCB ASSY

DRAWING NUMBER 400402

SHEET 7 OF 17

JW 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C1	120018	1μ5F 10% 63v POLYCARB	ASHCROFT	A2B1521B	1
C2	120030	820nF 10% 63v POLYCARB	ASHCROFT	SEE DRG.	1
C3	120021	470nF % 63v POLYCARB	ASHCROFT	A2B4711B	2
C4	120024	6μ8F 10% 63v POLYCARB	ASHCROFT	A2B6821B	1
C5	120020	220nF 10% 63v POLYCARB	ASHCROFT	A2B2211B	1
C6	150012	100nF 20% 35v DIP TANT	UNION CARBIDE	KR10E35	1
C7	120021	470nF 10% 63v POLYCARB	ASHCROFT	A2B4711B	–
C8	102680	68pF 5% 500v CER DISC	ITT	CD10	1
C9	102101	100pF 10% 500v CER DISC	ITT	CD10	2
C10	102471	470pF 10% 500v CER DISC	ITT	CD10	1
C11	150020	10μF 20% 25v DIP TANT	UNION CARBIDE	K10E25	8
C12	110013	100nF 20% 250v POLYESTER	MULLARD	C280AEP100k	5
C13	150020	10μF 20% 25v DIP TANT	UNION CARBIDE	K10E25	–
C14	150020	10μF 20% 25v DIP TANT	UNION CARBIDE	K10E25	–
C15	101103	10nF 25% 250v CER DISC	ITT	CD10	7
C16	150003	47μF 20% 6V3 DIP TANT	UNION CARBIDE	K47E6V3	1
C17	110013	100nF 20% 250v POLYESTER	MULLARD	C280AEP100k	–
C18	102108	1pF ±·5pF 500v CER DISC	ITT	CD06	1
C19	102470	47pF 5% 500v CER DISC	ITT	CD10	1
C20	150020	10μF 20% 25v DIP TANT	UNION CARBIDE	K10E25	–
C21	110013	100nF 20% 250v POLYESTER	MULLARD	C280AEP100k	–
C22	102100	10pF 5% 500v CER DISC	ITT	CD10	3
C23	102100	10pF 5% 500v CER DISC	ITT	CD10	–

NOTES

SEE SHEET . FOR LATEST ISSUE

ISS																	
E.C.O.																	
DATE																	
CHKD																	

DATE 17.8.79
DRAWN IL
CHECKED RJW
APPROVED
DATE

datron ELECTRONICS LTD

TITLE AC PCB ASSY

DRAWING NUMBER 400402 SHEET 8 OF 17

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No USED Per Assy
C24	102478	4p7F ±·5pF 500v CER DISC	ITT	CD08	2
C25	102478	4p7F ±·5pF 500v CER DISC	ITT	CD08	–
C26	150020	10μF 20% 25v DIP TANT	UNION CARBIDE	K10E25	–
C27	150020	10μF 20% 25v DIP TANT	UNION CARBIDE	K10E25	–
C28	150016	1μF 20% 35v DIP TANT	UNION CARBIDE	K1R0E35	1
C29	130071	150pF 1% 160v POLYSTYRENE	SUFLEX	HSQ150/1 – 7/160	2
C30	130013	18pF ±1pF 160v POLYSTYRENE	SUFLEX	HS18/1 – 7/160	1
C31	110013	100nF 20% 250v POLYESTER	MULLARD	C280AEP100k	–
C32	110035	220nF 20% 63V POLYESTER	WIMA	MKS2 MIN	2
C33	110035	220nF 20% 63v POLYESTER	WIMA	MKS2 MIN	–
C34		NOT USED.			–
C35	120022	1nSF 20% 100v POLYCARB	WIMA	FKC2 MIN	2
C36	120022	1nSF 20% 100v POLYCARB	WIMA	FKC2 MIN	–
C37	102101	100pF 10% 500v CER DISC	ITT	CD10	–
C38	102100	10pF 5% 500v CER DISC	ITT	CD10	–
C39	102331	330pF 10% 500v CER DISC	ITT	CD10	1
C40	150020	10μF 20% 25v DIP TANT	UNION CARBIDE	K10E25	–
C41	101103	10nF 25% 250v CER DISC	ITT	CD10	–
C42	130072	9p1F ±·5pF 160v POLYSTYRENE	SUFLEX	HS 9·1/·5 – 7/160	1
C43	130071	150pF 1% 160v POLYSTYRENE	SUFLEX	HSQ150/1-7/160	–
C44	150023	33μF 20% 25v DIP TANT	UNION CARBIDE	K33E25	1
C45	102120	12pF 5% 500v CER DISC	ITT	CD10	1
C46	102688	6p8F ±·5pF 500v CER DISC	ITT	CD10	1

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS																	
E.C.O.																	
DATE																	
CHKD																	

DATE 17.8.79
DRAWN IL
CHECKED RJW
APPROVED
DATE

datron ELECTRONICS LTD

TITLE AC PCB ASSY

DRAWING NUMBER 400402 SHEET 9 OF 17

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C47	101103	10nF 25% 250v CER DISC	ITT	CD10	—
C48	140035	10nF 1% 125v SILV. MICA	ITT	454/274	1
C49	140034	1nF 1% 300v GLASS	ELECTROSIL	CYFM15	1
C50	110013	100nF 20% 250v POLYESTER	MULLARD	C280AE P100k	—
C51	140033	91pF 1% 500v GLASS	ELECTROSIL	CYFM10	1
C52	110026	6n8F 20% 100v POLYESTER	WIMA	FKS2 MIN	1
C53	101103	10nF 25% 250v CER DISC	ITT	CD10	—
C54	101103	10nF 25% 250v CER DISC	ITT	CD10	—
C55	140039	15pF 5% 500v GLASS	ELECTROSIL	CYFM10	3
C56	150020	10μF 20% 25v DIP TANT	UNION CARBIDE	K10E25	—
C57	120001	220nF 10% 1kV POLYCARB	SUFLEX	SN1380	1
C58	140031	13pF 5% 500v GLASS	ELECTROSIL	CYFM10	1
C59	140039	15pF 5% 500v GLASS	ELECTROSIL	CYFM10	—
C60	140039	15pF 5% 500v GLASS	ELECTROSIL	CYFM10	—
C61	140008	10pf 1kV TRIMMER	JACKSON	TETFER VPC	1
C62	140036	25pF 1kV TRIMMER	JACKSON	TETFER VPC S646	2
C63	140036	25pF 1kV TRIMMER	JACKSON	TETFER VPC S646	—
C64	102228	2p2F ±.5pF 500v CER DISC	ITT	CD08	1
C65		NOT USED			—
C66	102220	22pF 5% 500V CER DISC	ITT	CD10	2
C67	102220	22pF 5% 500v CER DISC	ITT	CD10	—
C68	101103	10nF 25% 250V CER DISC	ITT	CD10	—
C69	101103	10nF 25% 250V CER DISC	ITT	CD10	—

NOTES

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE 17.8.79
DRAWN IL
CHECKED RJW
APPROVED
DATE

datron ELECTRONICS LTD

TITLE AC PCB ASSY

DRAWING NUMBER 400402

SHEET 10 OF 17

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
C70	102330	33pF 5% 500v CER DISC	ITT	CD10	2
C71	102330	33pF 5% 500v CER DISC	ITT	CD10	—
C72		NOT USED			—

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS																			
ECO																			
DATE																			
CHKD																			

DATE
DRAWN
CHECKED
APPROVED
DATE

datron ELECTRONICS LTD

TITLE AC PCB. ASSY.

DRAWING NUMBER 400402

SHEET 11 OF 17

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
D1	220010	Si HOT CARRIER DIODE	HP	HSCH1001/IN6263	3
D2	200008	200mA 125V LL Si DIODE	FAIRCHILD	IN458A	5
D3	200008	200mA 125V LL Si DIODE	FAIRCHILD	IN458A	–
D4	200008	200mA 125V LL Si DIODE	FAIRCHILD	IN458A	–
D5	210100	10v 400mW ZENER	MULLARD	BZY88C10	2
D6	200008	200mA 125v LL Si DIODE	FAIRCHILD	IN458A	–
D7	210100	10v 400mW ZENER	MULLARD	BZY88C10	–
D8	220010	Si HOT CARRIER DIODE	HP	HSCH1001/IN6263	–
D9	220010	Si HOT CARRIER DIODE	HP	HSCH1001/IN6263	–
D10		NOT USED			–
D11	220021	QUAD 29pF VARICAP DIODE	THOMPSON-CSF	BB109G4	SET OF 4
D12	200008	200mA 125v LL Si DIODE	FAIRCHILD	IN458A	–
D13	200001	75mA 75V GP Si DIODE	FAIRCHILD	IN4148	2
D14	220020	FET DIODE 100pA I_R	TELEDYNE	PAD100	3
D15	220020	FET DIODE 100pA I_R	TELEDYNE	PAD100	–
D16	200001	75mA 75v GP Si DIODE	FAIRCHILD	IN4148	–
D17	220020	FET DIODE 100pA I_R	TELEDYNE	PAD100	–

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD														

DATE 17.8.79
DRAWN IL
CHECKED RJW
APPROVED
DATE

datron ELECTRONICS LTD

TITLE AC PCB ASSY

DRAWING NUMBER 400402 SHEET 12 OF 17

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
Q1	230002	N-CHAN JFET	TELEDYNE	U1994JF	3
Q2	230002	N-CHAN JFET	TELEDYNE	U1994JF	–
Q3	230027	N-CHAN JFET	TELEDYNE	U3114JF	1
Q4	240013	Si NPN TRANSISTOR	NATIONAL	BC184C/TO18	4
Q5	240006	Si NPN TRANSISTOR	NATIONAL	2N3904/TO18	7
Q6	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/TO18	7
Q7	240013	Si NPN TRANSISTOR	NATIONAL	BC184C/TO18	–
Q8	250008	Si PNP TRANSISTOR	NATIONAL	BC214C/TO18	6
Q9	230001	N-CHAN CURRENT LIM	SILICONIX	E506	1
Q10	250008	Si PNP TRANSISTOR	NATIONAL	BC214C/TO18	–
Q11	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/TO18	–
Q12	240006	Si NPN TRANSISTOR	NATIONAL	2N3904/TO18	–
Q13	250008	Si PNP TRANSISTOR	NATIONAL	BC214C/TO18	–
Q14	240013	Si NPN TRANSISTOR	NATIONAL	BC184C/TO18	–
Q15	240006	Si NPN TRANSISTOR	NATIONAL	2N3904/TO18	–
Q16	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/TO18	–
Q17	240006	Si NPN TRANSISTOR	NATIONAL	2N3904/TO18	–
Q18	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/TO18	–
Q19	230035	N-CHAN JFET	TELEDYNE	U1897JF	1
Q20	250008	Si PNP TRANSISTOR	NATIONAL	BC214C/TO18	–
Q21	250008	Si PNP TRANSISTOR	NATIONAL	BC214C/TO18	–
Q22	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/TO18	–
Q23	250004	Si PNP TRANSISTOR	NATIONAL	2N3906/TO18	–

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD.														

DATE 17.8.79
DRAWN IL
CHECKED RJW
APPROVED
DATE

datron ELECTRONICS LTD

TITLE AC PCB ASSY

DRAWING NUMBER 400402 SHEET 13 OF 17

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
Q24	240006	Si NPN TRANSISTOR	NATIONAL	2N3904 / TO18	–
Q25	250004	Si PNP TRANSISTOR	NATIONAL	2N3906 / TO18	–
Q26	240006	Si NPN TRANSISTOR	NATIONAL	2N3904 / TO18	–
Q27	250008	Si PNP TRANSISTOR	NATIONAL	BC214C / TO18	–
Q28	240013	Si NPN TRANSISTOR	NATIONAL	BC184C / TO18	–
Q29	240006	Si NPN TRANSISTOR	NATIONAL	2N3904 / TO18	–
Q30	230003	N-CHAN JFET	TELEDYNE	U1899 JF	1
Q31	230002	N-CHAN JFET	TELEDYNE	U1994 JF	–
Q32	230031	N-CHAN DUAL JFET	TELEDYNE	SU2656M	2
Q33	240019	Si NPN DUAL TRANSISTOR	PMI	MAT01H	1
Q34	230031	N-CHAN DUAL JFET	TELEDYNE	SU2656M	–

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD														

DATE	17.8.79
DRAWN	IL
CHECKED	RZW
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: AC PCB ASSY

DRAWING NUMBER 400402 — SHEET 14 OF 17

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
M1	260027	714 OP AMP	FAIRCHILD	μA714HC	5
M2	260027	714 OP AMP	FAIRCHILD	μA714HC	–
M3	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076BCP	2
M4	280015	QUAD D-TYPE LATCH	MOTOROLA	MC14076BCP	–
M5	280011	DUAL D FLIP-FLOP	MOTOROLA	MC14013BCP	1
M6	290026	RMS KIT	DATRON	SEE DRG	–
M7	270059	7x DARLINGTON DRIVER	SPRAGUE / EXAR	ULN2004A / XR2204CP	1
M8	260027	714 OP AMP	FAIRCHILD	μA714HC	–
M9	260027	714 OP AMP	FAIRCHILD	μA714HC	–
M10	290066	FREQ. SENSITIVE SWITCH	CONSUMER MICROCIRCUITS	FX301L	1
M11	260027	714 OP AMP	FAIRCHILD	μA714HC	–
RL1	330012	RELAY REED 1A GUARDED	HAMLIN	HE721A5134	4
RL2 (1)	330003	RELAY 2P2W CROSS BAR	P & B	RIO-E1-L2-Q5-8K(25207)	2
RL3 (1)	330003	RELAY 2P2W CROSS BAR	P & B	RIO-E1-L2-Q5-8K(25207)	–
RL4	330012	RELAY REED 1A GUARDED	HAMLIN	HE721A5134	–
RL5	330012	RELAY REED 1A GUARDED	HAMLIN	HE721A5134	–
RL6	330012	RELAY REED 1A GUARDED	HAMLIN	HE721A5134	–

NOTES. (1) ALTERNATIVE RELAY 330015 (OMRON) — USE M2·3 FULL HEX NUT 615014 (CHALLENGE IND. FASTENERS). 2 OFF

SEE SHEET 2 FOR LATEST ISSUE

ISS														
ECO														
DATE														
CHKD														

DATE	17.8.79
DRAWN	IL
CHECKED	RZW
APPROVED	
DATE	

datron ELECTRONICS LTD

TITLE: AC PCB ASSY

DRAWING NUMBER 400402 — SHEET 15 OF 17

J.W. 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
TP's, TL's.	540002	22 SWG. TINNED COPPER WIRE			A/R
	590004	SLEEVE — PTFE	HELLERMANN ELECTRIC	FE10	A/R
J1	571095\C	16 WAY AP/3M RIBBON CABLE	DATRON		1
J2	605052	8 WAY POLARISED SOCKET	MOLEX	(22-01-2085) 6471-8-1	1
	590055	SLEEVE Ø1·0 SIL. RUBBER	HELLERMANN ELECTRIC	HIS CONT. BLACK	50 mm
	400379/1	WIRE/TERMINAL ASSY.			1
	410136-4	PCB			1
	450249-2	GUARD SHIELD			1
	459112-2	RELAY BRACKET			2
	605056	CRIMP TERMINAL	MOLEX	4809-TL	1
	540008	7/0·2 PTFE INSULATED (WHITE) WIRE			A/R
	590001	SLEEVE MAX. CABLE Ø3·0	HELLERMAN ELECTRIC	HIS x 20mm BLACK HELSYN	7
	602001	FSV TERMINAL	MOLEX	02-04-1875	2
	602004	BREAKAWAY TERMINAL STRIP	MOLEX	05-30-0001	16
	605060	14 PIN DIL SOCKET	ASTRALUX	ICL 143-S3T	1
	605061	16 PIN DIL SOCKET	ASTRALUX	ICL 163-S6T	3
	605057	CRIMP TERMINAL	MOLEX	4809-GL	1
	611007	SCREW M3x6mm STEEL POZI-	CSK ZN/PLATED GKN		3
	611016	SCREW M3x8mm STEEL POZI-	PAN ZN/PLATED GKN		5

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS													
ECO													
DATE													
CHKD													

DATE 17.8.79
DRAWN IL
CHECKED RJW
APPROVED
DATE

datron ELECTRONICS LTD

TITLE AC PCB ASSY.

DRAWING NUMBER 400402 SHEET 16 OF 17

J W 1164

DESIGNATOR	DATRON PART No.	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No.	No. USED Per Assy.
	612021	STANDOFF M3×16 HEX STEEL	HARWIN	R6077-M3	3
	613005	WASHER M3 INT./SHAKEPROOF ST.	GKN DISTRIBUTORS	ZINC PLATED	5
	613014	WASHER M2·5 INT/SHAKEPROOF ST.	GKN DISTRIBUTORS	ZINC PLATED	2
	615002	NUT M3 FULL HEX STEEL		ZINC PLATED	2
	615005	NUT 3-48 UNC FULL HEX.ST.		ZINC PLATED	2
	617010	NYLATCH PLUNGER HN3P	ORDER FROM C.J.FOX & SONS	HN3P-32-4-1	4
	617011	NYLATCH GROMMET HN3G	ORDER FROM C.J.FOX & SONS	HN3G-32-1	4
	620003	SOLDER PCB TERMINAL LUG	HARWIN	H2105A	2
	620005	CLOVERLEAF PTFE TERMINAL	SEALECTRO	FTE 15 P20	15
	630107	BRASS STRIP ·375mm THK ×15·5	RIGHTON	½ HARD	130mm

NOTES.

SEE SHEET 2 FOR LATEST ISSUE

ISS													
ECO													
DATE													
CHKD													

DATE 17.8.79
DRAWN IL
CHECKED RJW
APPROVED
DATE

datron ELECTRONICS LTD

TITLE AC PCB ASSY.

DRAWING NUMBER 400402 SHEET 17 OF 17

J.W. 1164

DESIGNATOR	DATRON PART No	DESCRIPTION	PRINCIPAL MANUFACTURER	MANUFACTURER'S PART No	No USED Per Assy
	400382 SHT 2	OPTION FITTING ASSY DRG	DATRON		
	400306	IEEE 488 OPTION PCB ASSY	DATRON		1
	573140	RIBBON CABLE ASSY			1
	400363	SOCKET PCB ASSY	DATRON		1
	400346	ADDRESS SWITCH PCB ASSY	DATRON		1
	400400	EXTERNAL TRIGGER ASSY	DATRON		1
	450169-2	STUD MOUNT STANDOFF			2
	450225-1	IEEE ADAPTOR PLATE			1
	G11006	SCREW M3×10 POSI PAN HD			2
	G13005	WASHER M3 INTERNAL SH'K PROOF			2
	G13020	WASHER M4 FLAT-STEEL			2
	G13021	WASHER M4 INTERNAL SH'K PROOF			2
	G15011	NUT M4 FULL HEX-STEEL			2
	G30042	ADHESIVE CABLE CLIP	RICHCO	CFCC-8	2
M4	SEE TABLE	4K×8 EPROM	DATRON	—	1

NOTES CIRCUIT REFER 430295

SEE SHEET 2 FOR LATEST ISSUE

TYPE	KIT	M4
1061	440068	290070-8A
1071	440065	290069-7A

ISS	A	1	2	3	4	5	6	7	8	9
ECO	-	—	1005	1017	NOT USED	1000	1057	1083	1086	1106
DATE	15 MAY 79	18 MAY 79	26-OCT 79	4-12-79	13-12-79	18.1.80	23.1.80	4.3.80	20.3.80	28.3.80
CHKD			MD	MD	MD	MD	MD	MD	MD	MD

DATE 15 MAY 79

DRAWN W.G.SMITH

CHECKED G.C.M.

APPROVED

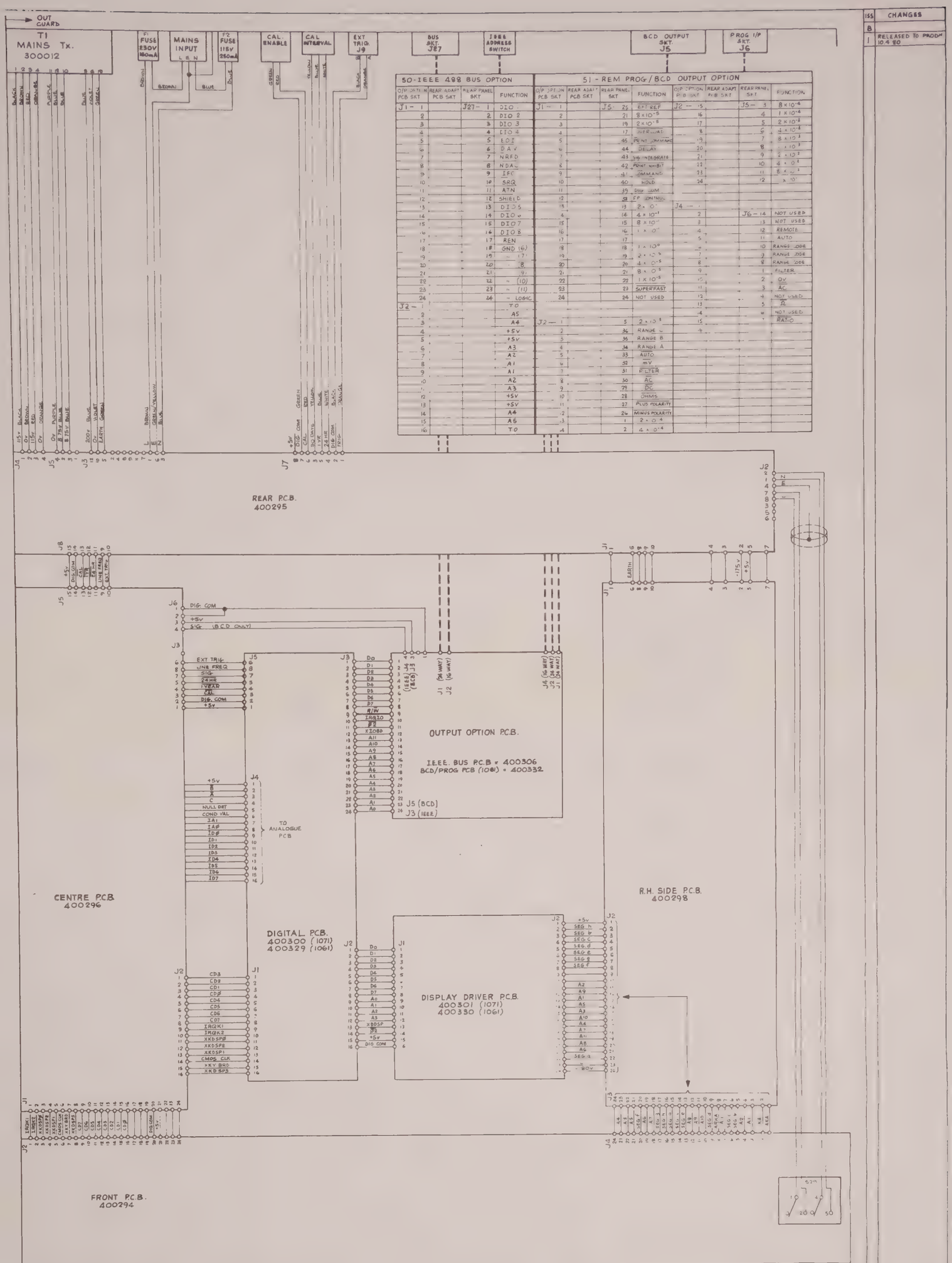
DATE 18 MAY 79.

datron ELECTRONICS LTD

TITLE I.E.E.E. 488 OPTION 1071/1061

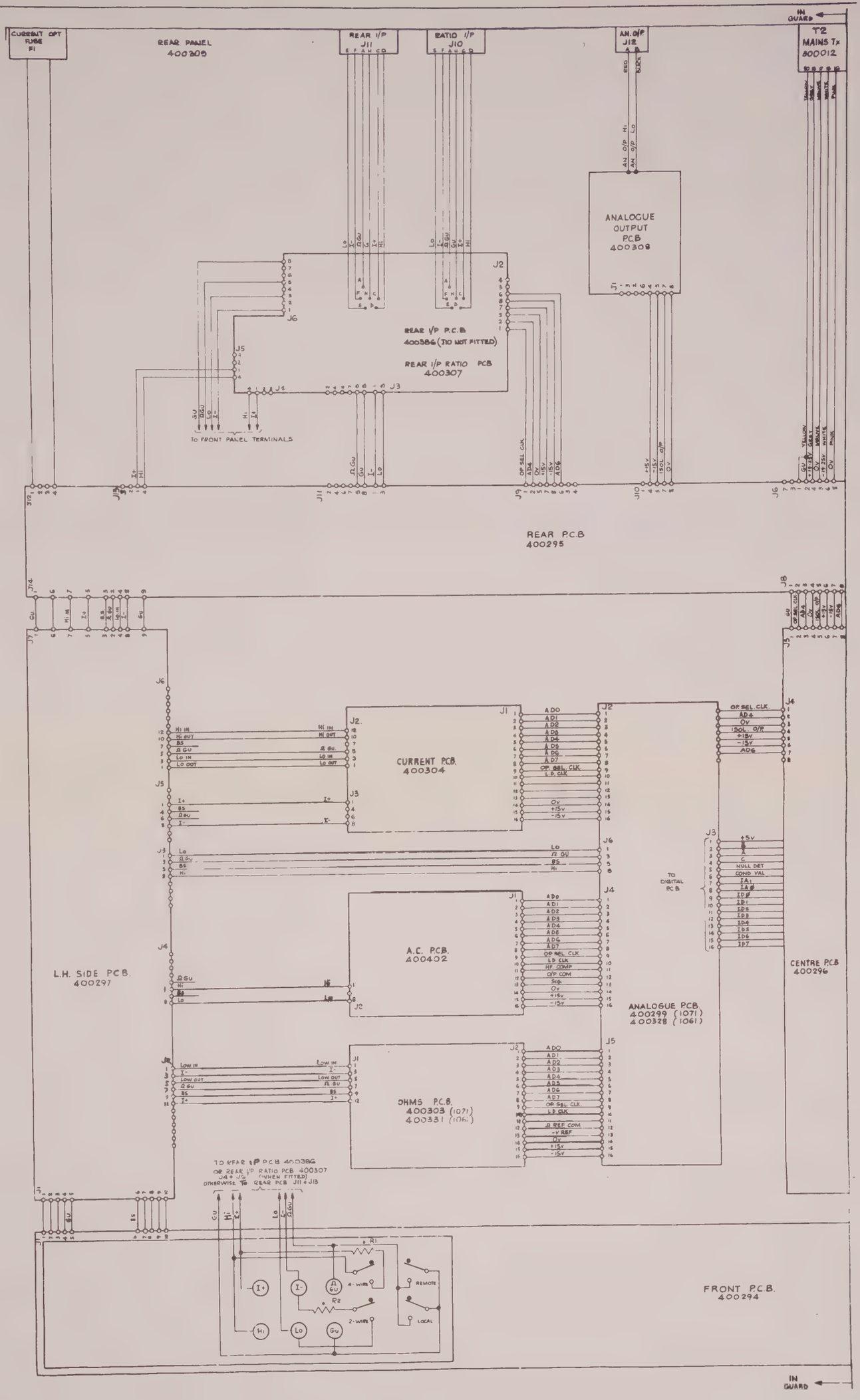
DRAWING NUMBER 440065/68

SHEET 1 OF 1



DRAWN IL	CHECKED MA	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED ANGULAR ± °	MATERIAL	datron ELECTRONICS LTD. NORWICH.
TRACED	APPROVED	SCALE		FINISH	TITLE 1061 / 1071 INTERCONNECTION DIAGRAM.
DATE 31 1 79	DATE	NOT TO BE SCALED			DRAWING SIZE A1 DRAWING NO 430291 430326 SHEET 1 OF 2

430291 /430326.



datron ELECTRONICS LTD. NORWICH.

A

TITLE 1061/1071 INTERCONNECTION DIAGRAM

DRAWING N 430291/430326

SHEET 2 2

400294

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

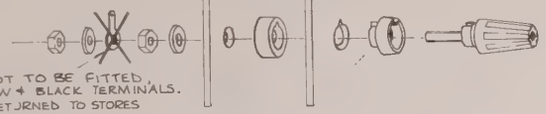
IMPORTANT.

1. FIT M1 3 4 5 6 8 9 11 12 & 13 INTO 16 WAY AUGAT SOCKET PART NO. 605061.
   FIT M7 & M10 INTO AUGAT SOCKET PART NO. 605062. 18 WAY.
   FIT M2 INTO AUGAT SOCKET PART No. 605060. 14 WAY.
2. TO REMOVE DISPLAY:-
   CUT PINS HERE
   SLIDE THIN STEEL RULE BETWEEN DISPLAY & PCB TO SPLIT FOAM TAPE.

D	UPDATED PCB REMOVED 529	MD
1	RELEASED TO PRODN 29-8-78	
2	SKETCH FOR HOLTITE SOCKETS ADDED BJ. ECO 778 5-12-78	A
3	ECO 806 WARNING LABEL 4700B0-1 ADDED ECO 808. C3 & C6 WERE 0.33uF (50010) 25 JAN 79 WGS	
4	ECO 807 LK3 ADDED BJ 11 JUN 79	MD
5	ECO 968 26-10-79 UPDATED PCB & 2 PIECES OF 630025. DELETED SOCKETS:- 602011 & 602012 DISPLAY REMOVAL NOTE	MD
6	ECO 1111 C9 ADDED IL 21-4-80	MD
7	ECO 1213 LK3 DELETED JR 11 6 81	MD

P.C.B.

TERMINAL PLATE



SOLDER TAG NOT TO BE FITTED, EXCEPT ON YELLOW & BLACK TERMINALS. THE REST TO BE RETURNED TO STORES UNDER PART Nº 613009

ASSEMBLE 6 TERMINALS TO TERMINAL PLATE (PART Nº 450179) AND P.C.B AS SHOWN ABOVE. TERMINAL COLOURS MUST BE AS INDICATED BELOW.

NOTE.
NO COMPONENTS TO STAND HIGHER THAN 7·5 mm (EXCEPT SWITCH'S & TERMINALS)
EXCEPT Q4 & Q5 WHICH MUST BE LESS THAN 6·5 mm

SLEEVE LEADS OF C9 WITH HEATSHRINK ø 4·8 590032 & SOLDER TO TAGS ON YELLOW & BLACK TERMINALS

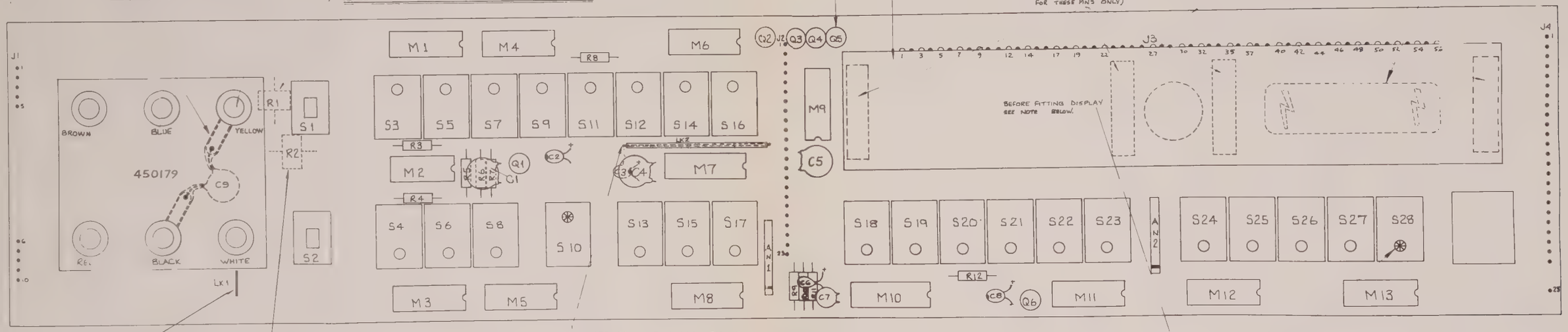
RESISTORS R1 & R2 (SHOWN BY DOTTED LINES) TO BE MOUNTED ON UNDERSIDE OF BOARD.

8½ DIGIT DISPLAY (DATRON PART NO 800017)

DISPLAY TO HAVE 4 PIECES (25mm LONG) OF PRESSURE SENSITIVE TAPE PART No 630025 STUCK TO REVERSE OF DISPLAY IN POSITIONS SHOWN. LINE UP & PRESS DISPLAY FIRMLY INTO PLACE THEN SOLDER THE 24 PINS ONLY WHICH ARE SHOWN BELOW. (THERE ARE SOLDER PADS FOR THESE PINS ONLY)

FIT WARNING LABEL 420080-1 IN APPROX POSITION SHOWN ON TRACK SIDE OF PCB NEAR MAINS AND DISPLAY CONNECTIONS

FRONT P.C.B. 410090-4C



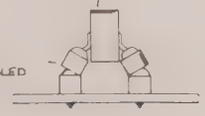
ALL LINKS USE 22SWG TIN CU WIRE PART No 540002

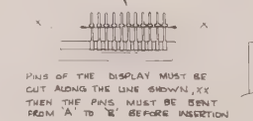
LINK WIRE 22 SWG TIN Cu WIRE 540002. SLEEVE WITH 590004.

ALL CAPACITORS TO BE LAID DOWN WHERE POSSIBLE, AS SHOWN. LEADS TO BE BENT AT RIGHT ANGLES THEN INSERTED INTO BOARD, THIS IS TO KEEP CAPACITORS AS LOW AS POSSIBLE

GREEN L.E.D.s 2 OFF ALL OTHERS RED

RESISTORS R1 & R2
2 OFF INSULATING BEADS (PART No 630024) ASSEMBLED ON EACH LEG (AS SHOWN)





PINS OF THE DISPLAY MUST BE CUT ALONG THE LINE SHOWN, XX THEN THE PINS MUST BE BENT FROM 'A' TO 'B' BEFORE INSERTION INTO PCB

B J

19-4-78

2:1

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A1

TITLE: FRONT P.C.B ASSY 1061 / 1071

DRAWING N 400294

SHEET 1 of 6

DRAWING No 430294

FIRST USED ON 1081/71

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1. SIGNAL CDI ON J2-15, THERE IS A LINK LIKE IN THIS SIGNAL LINE.

No	CHANGES
2	REDRAWN BJ 21-3-75
3	ECO 888 869 CHANGE ON SHTS BJ 11-6-79
4	ECO 1111 SEE SHEET 2 IL 21-4-80

J2-1 IRQK1
J2-2 IRQK2
J2-21 +5V
J2-20 DIG COMM
J2-17, J2-18, J2-19, J2-22, J2-23 UNUSED PINS.
J2-7 ZKYB25
J2-16 CD0
J2-15 CD1
J2-14 CD2
J2-13 CD3
J2-12 CD4
J2-11 CD5
J2-10 CD6
J2-9 CD7
J2-6 CMOS CLK
J2-4 XKB24
J2-5 XKB3PT
J2-3 XKB24
J2-8 XKB23

C5 0.01μF, C2 10μF 16V, C8 10μF 16V

M2. MC14018.BCP

M10. MM74C922

M7. MM74C922

S22 ERROR, S21 TEST, S20 RATIO, S19 HOLD, S26 MAX, S25 -C, S23 AV, S24 (A-B), S18 MAN, S28 RESET, S27 MIN, S15 AC, S6 INPUT FILTER

S16 SIG 10M.Ω, S14 1000, S11 10, S12 100, S3 AUTO, S3 10.Ω, S7 .1, S9 1, S13 K.Ω, S17 DC, S4 INPUT ZERO, S8 Σ, S10 KEY

C7 0.01μF, C6 1.0μF 25V, C3 1.0μF 25V, C4 0.01μF

R6 1K, R7 100K, Q1 BC184, C1 100pF

CMOS DATA BUS

M12 MC14076., M11 MC14076., M8 MC14076., M5 MC14076., M6 MC14076., M4 MC14076., M9 MC14076.

AN2. 150R, AN1. 150R

R12 150R, R5 150R, R4 150R, R8 150R, R3 150R, R10 150R, R5 150R, R11 150R

S(b)24, S(b)27, S(b)26, S(b)28, S(b)25, S(b)23, S(b)22, S(b)21, S(b)17, S(b)15, S(b)18, S(b)13, S(b)10, S(b)6, S(b)4, S(b)16, S(b)14, S(b)7, S(b)12, S(b)5, S(b)11, S(b)8, S(b)3, S(b)19, S(b)20, S(b)19

Q6 BC184, Q2 BC184, Q3 BC184, Q4 BC184, Q5 BC184

M13. CA30BIP. M3. CA30BIP. M1. CA30BIP.

TO J1 CENTRE PCB.

J3		J4
J3-1	ALKA	J4-1
J3-5	-175V	J4-2
J3-50		
J3-3	A1	J4-3
J3-7	A2	J4-4
J3-5	b	J4-5
J3-14	c	J4-6
J3-56	A11	J4-7
J3-52	AEKA	J4-8
J3-54	d	J4-9
J3-48	A10	J4-10
J3-42	A9	J4-11
J3-37	A8	J4-12
J3-46	e	J4-13
J3-44	i	J4-14
J3-40	a	J4-15
J3-36	h	J4-16
J3-30	g	J4-17
J3-32	A7	J4-18
J3-27	A6	J4-19
J3-19	f	J4-20
J3-22	A5	J4-21
J3-12	A3	J4-22
J3-17	A4	J4-23
		J4-24
	MAIN SWITCH GND	J4-25

TO DIGITAL DISPLAY 800017

TO J3 RIGHT HAND PCB

BJ	CHECKED P.R.W.	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005, DECIMAL TO 2 PLACES ± .010, FRACTIONAL ± 1/64. METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm, DECIMAL TO 1 PLACE ± 2mm, WHOLE DIMENSIONS ± 4mm. UNLESS OTHERWISE STATED
DATE 21-3-75.	APPROVED DATE	NOT TO BE SCALED	MATERIAL —— FINISH ——

datron ELECTRONICS LTD. NORWICH.

TITLE FRONT P.C.B. CIRCUIT DIAGRAM

DRAWING SIZE A1

DRAWING No 430294

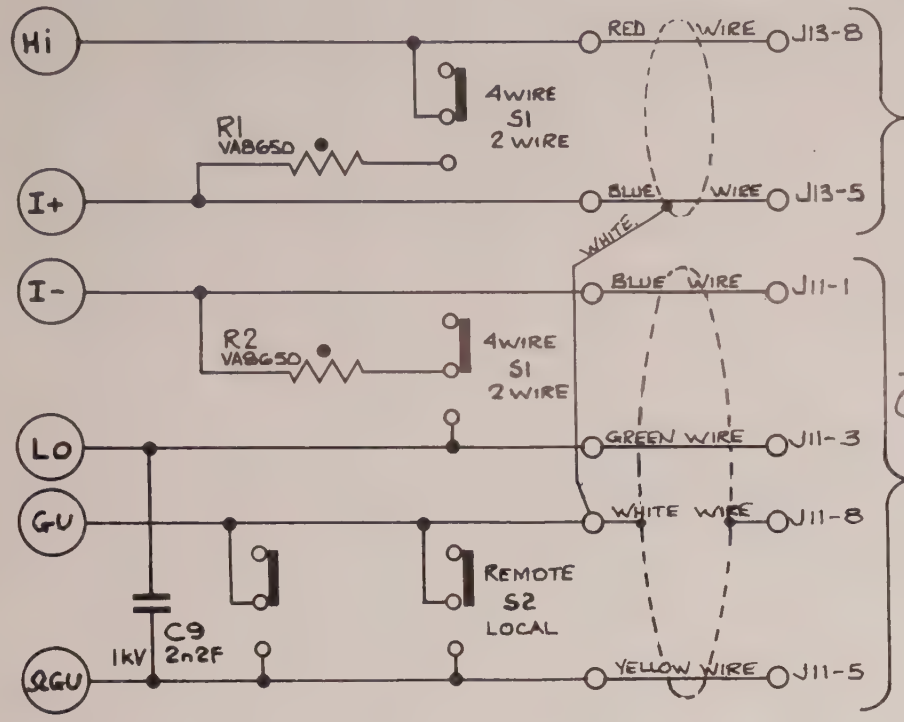
SHEET 1 OF 2

430294 THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH B.S. 308

ALL BURRS TO BE REMOVED

ISS.	CHANGES
2.	REDRAWN BJ 21.3.79
3.	ECO 850. SCREEN FOR Hi & I+ NOW CONNECTED TO G. VIA WHITE WIRE.
4	ECO. 1111 C9 ADDED IL 21.4.80



NOTES:

1/ G(J1-5) SCREENS ALL CIRCUITRY ON THIS SHEET.

2/ B.S. SCREENS Hi & I+.

3/ SLG SCREENS LO & I-.

DRAWN BJ.	DATE 21-3-79	DIMENSIONS IN — MILLIMETRES	TOLERANCES ANGULAR ± ½° DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL —	datron ELECTRONICS LTD. NORWICH	DRAWING SIZE A4
CHKD DEG	DATE	SCALE — NOT TO BE SCALED		FINISH —	TITLE FRONT PCB CIRCUIT DIAG.	DRAWING No. 430294
APPD	DATE					SHEET 2 OF 2

J.W. 1786

4961HT

DRAWING No 400295
FIRST USED ON

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

4 OFF STEEL M3x8mm SCREW. 611016.
9 OFF NYLON M3 x 8mm SCREW. 611037.
4 OFF STEEL SHAKEPROOF WASHER. 613005.
9 OFF NYLON M3 WASHER . 613017.
2 OFF STEEL M3 NUT . 615002.
3 OFF NYLON M3 NUT . 615006.

ALL BURRS TO BE REMOVED

NOTES

ISS	CHANGES
C	
D	UPDATED PCB BJ 22-8-78 MD
1	RELEASED TO PRODN 28-8-78
2	ECO 783. 18-12-78 COMPONENT CHANGES BJ MD
3	ECO 816. WARNING LABEL 4200801 ADDED 25 JAN 79 W.G.S X
4	ECO 876, 882, 900. C6 ADDED JS NOW GOLD ISSUE 4 PCB. LJ2 & LK3 ADDED. R13 ADDED C8 MOVED R22 & R3 CHANGED. 6-6-79 BJ MD
5	ECO 931 & 934 PCB WAS 155 4 JI. B & 14 EXTS GOLD DELETED I FUSE LINK WAS SOCKET WITH 4 PINS W1 WAS 2090-13 MICA WASHERS WERE 618005 BJ 31-10-79 MD
6	ECO 1085 1097 2 OFF SOLDER PINS & 1 OFF 4 WAY WAFER (J13) DELETED IL 21 4 80 MD

1 off HEATSINK 450180

THIS HEATSINK HELD TO PCB BY
STEEL M3 x 8mm SCREWS
STEEL M3 SHAKEPROOF WASHERS

Q1 & M1 HELD TO HEATSINK WITH
NYLON M3 x 8mm SCREWS
NYLON M3 WASHERS
NYLON M3 NUTS.

2 off MICA WASHER.

USE M3 x 8mm NYLON SCREWS.
M3 NYLON WASHERS
M3 NYLON NUT.

1 off MICA WASHER

3 off HEATSINK 450183.

THESE 2 HEATSINKS HELD TO PCB WITH NYLON M3 x 8mm SCREWS & NYLON M3 WASHERS

M2 & M3 HELD TO HEATSINKS WITH STEEL M3 x 8mm SCREWS
STEEL M3 SHAKEPROOF WASHERS
STEEL M3 NUTS

FIT WARNING LABEL 4200801 IN APPROX POSITIONS SHOWN ON TRACK SIDE OF P.C.B IN MAINS AREA.

HEATSINK COMPOUND ON BOTH SIDES OF MICA WASHERS ON Q1 & M1.

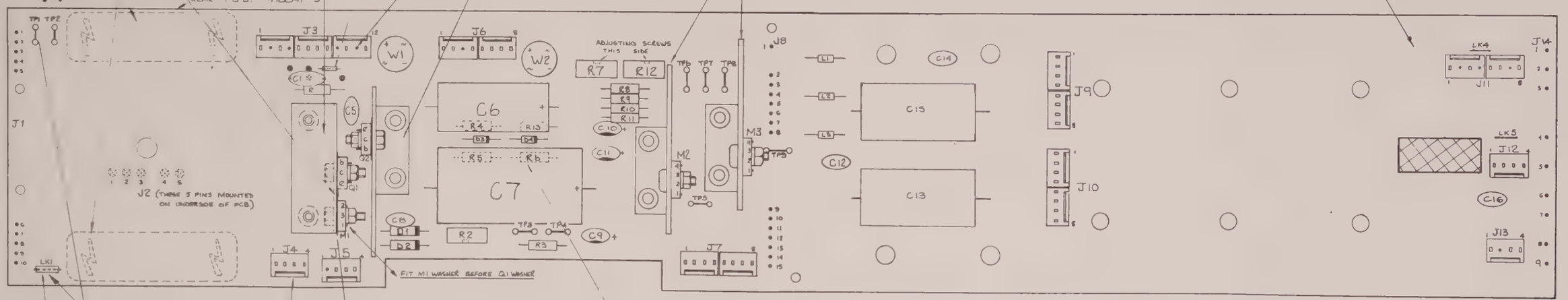
SLEEVED LINK

BLACK DOTS INDICATE THAT PIN HAS TO BE REMOVED BEFORE INSERTION INTO P.C.B.

J11 J12 & J13 USE GOLD FLAT PIN ASSY (PART No 604033) 4 off.

TEST POINT. 3mm

REAR P.C.B. 410091-5



FIT M1 WASHER BEFORE Q1 WASHER

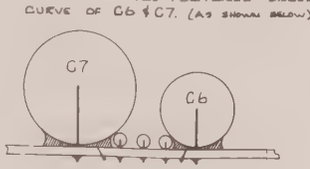
ALL LINKS & TEST POINTS USE 22 SWG TIN CU WIRE (DATRON PART No 54002)

3 off MICA WASHER PART No 618007.

FLAT PIN ASSY TIN (PART No 604032) 15 off.

BACKPLATE INDICATES WHICH WAY THE PIN ASSY FITS INTO THE P.C.B

R4, R5 & R6 ARE POSITIONED UNDER THE CURVE OF C6 & C7. (AS SHOWN BELOW)



LINKS 1, 2 & 3 MUST BE SLEEVED USING 590004

FOR 115 V OPERATION
REMOVE LK1 , FIT LK2 & LK3

THE 4 LARGE CAPACITORS C6, C7, C13 & C15 ARE TO BE BEDDED INTO SILICONE RUBBER COMPOUND PART No 900004 BEFORE SOLDERING THIS SHOULD FINISH UP AS ABOVE DRAWING

BJ	DIMENSIONS IN MM	TOLERANCES NON DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONS ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	ANGULAR ± °	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
26-4-78	SCALE 2:1 NOT TO BE SCALED			FINISH	TITLE REAR P.C.B. ASSEMBLY 1061 / 1071	DRAWING No 400295 SHEET 1 OF 6

DRAWING No. 430295

FIRST USED ON 1081/71

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

1. T1, T2, MAINS INPUT FILTER, F1, EXT TRIG. OPTION, ERROR SELECT & CAL ENABLE. ARE ALL FITTED ON THE REAR PANEL ASSY 430306, BUT INCLUDED ON THIS CIRCUIT DIAGRAM

2	RE DRAWN 30-3-79 BJ	
3	ECO 882 & 900 ADDED C18, E18, L1, L2, L3 & LK4. R8 & R2 CHANGED 8-6-79 BJ	MC
4	ECO 891 & 934 W1 WAS W006 (430018) J8 PIN No° CHANGED J2 " " " LK5 ADDED. BJ J8-9 ADDED 31-10-79	MD
5	ECO 1085 J13 PINS 1 TO 4 DELETED 21 4 80	MD
6	ECO 1125 FUSE IN NEUTRAL LINE TO J3-3 DELETED 22 5 80	MD

LIVE — F1 160mA 230V (250mA 115V) — J3-1 — J2-5 — S2 — J2-4 — J4-4 — ORANGE 4 0V

LK3 (115V) — 115V — RED 3 15V

LK1 (230V) — J4-3

LK2 (115V) — J4-2 — BROWN 2 0V — 115V

NEUTRAL — J3-3 — J2-1 — J2-2 — J4-1 — BLACK 1 15V

J2-3

EARTH — J3-6

J3-8

MAINS INPUT FILTER

T1

GREY 7 5V — J3-7 — WHITE 8 5V — GREY 9 5V

VIOLET 6 0V — J3-10 — 200V 22mA — BLUE 5 200V — J3-12 — W1 W004

C6 10μF 350V

RG 180K — D3 BZY88C6V8 — R4 430R 1% MF — Q2 MJE340

D4 IN5218B 18Ov — R13 1K — R5 1K — Q1 MJE340 — C5 0·01μF

+5V — J1-5 — TP2 — J1-1 — J1-3 — J1-4 — EARTH — J1-6 — J1-7 — J1-8 — J1-9 — J1-10 — -17·5V — J1-2 — TP1

TO J1 EIGHT HAND P.C.B

BLUE 8 A.C. 12 — J5-2 — D1 3051 — 8V8 750mA

PURPLE 11 0V — J5-3 — D2 3051 — 8V8 750mA

BLUE 10 A.C. — J5-4

C8 0·01μF — M1 MC7805CP — C7 4700μF 16V — R3 220R — R2 20R POT (SET +5V) — C9 47μF 6V3.

R1 100K. — C1 0·1μF

LINE FREQ — J8-9 — +5V — J8-15 — TP3 — J7-8

TP4 — DIG COM — J8-14

J9 EXT TRIGGER OPTION — A — B

IVR 300 24HR CALIBRATION INTERVAL

CAL. ENABLE — RUN — CAL

BLACK — J7-2

YELLOW — J7-3

GREEN — J7-7

RED — J7-6 — CAL — J8-13

WHITE — J7-4 — 24HR — J8-11

BLUE — J7-5 — 1 VR — J8-12

ORANGE — J7-1 — EXT TRIG — J8-10

To J5 CENTRE P.C.B

OUT OF GUARD / IN GUARD

GU — J8-1

T2

WHITE 19·25V 15 — J6-6 — GREY 14 — 10V — GREY 13

PINK 0V 16 — J6-8

MAUVE 0V 17 — J6-5

GREY HD 25V 18 — J6-4 — 19V25 220mA — 19V25 300mA — W2 W01.

L1 10μH — L2 10μH — L3 10μH

M2 μA78MGUC — M3 μA79MGUC

C15 1000μF 35V — C14 0·01μF — C12 0·01μF — C13 1000μF 35V

R9 5K1 1% MF. — R7 1K POT. — R8 4K02 1% MF. — R10 2K 1% MF — R12 500R POT. — R11 1·5K 1% MF

C10 22μF 25V — C11 22μF 25V

TP5 — TP6 — TP7 — TP8

+15V — J8-6 — 0V — J8-4 — -15V — J8-7

GU — J10-1 — +15V — J10-2 — J10-4 — J10-8 — 0V — J10-3 — J10-5 — -15V — J10-6 — J8-5 — 150L O/P — J10-7

To J1 ANALOGUE OUTPUT OPTION.

J8-2 — OP SEL CLK — J9-1 — J8-3 — ADd — J9-2 — +15V — J9-3 — J9-7 — J9-4 — J9-5 — J8-8 — ADG — 0V — J9-6 — J9-8 — -15V

To J2 REAR INPUT RATIO.

OUT OF GUARD / IN GUARD

TO J7 LEFT HAND PCB

J14-1 GUARD — GU — LK4 — J11-8

J14-2 Ω GUARD — J11-5

J11-7, J11-6, J11-4

J14-4 LO — J11-3

J11-2

J14-8 I- — J11-1

TO FRONT PCB TERMINALS. J11 OR REAR I/P OR REAR I/P RATIO J3

J14-5 I+ — J12-4 — J12-3 — J12-2 — J12-1 — LK5 — I+

J14-6

TO CURRENT FUSE (PINS 1 & 4 LINKED (LK5) WHEN CURRENT OPTION NOT FITTED)

J14-7 Hi — C16 1nF. — J13-1 — J13-2 — J13-4 — J13-3

TO FRONT PCB TERMINALS. J13 OR REAR I/P OR REAR I/P RATIO J5

J14-9 GU

J3-2, J3-4, J3-9, J3-11

UNUSED PINS FROM J3.

J2-3, J2-5, J2-6

UNUSED PINS FROM J2.

J6-7, J6-3

UNUSED PINS FROM J6.

OUT OF GUARD / IN GUARD

B.J. 30-3-79.

ANGULAR	MATERIAL
NS O 3 PLACES + 005 O 2 PLACES + 010 + 1/64 AL IONS O 2 PLACES + 1mm O 1 PLACE + 2mm MENSIONS + 4mm WISE STATED	FINISH

datron ELECTRONICS LTD NORWICH.

REAR PCB (INCLUDING REAR PANEL) CIRCUIT DIAGRAM

DRAWING SIZE A1

DRAWING No 430295

SHEET 1 OF 1

DRAWING No 400296

FIRST USED ON 1061 /1071

THIRD ANGLE PROJECTION

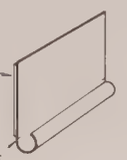
DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS	CHANGES	
C		
D	D1, D2, D3, R1 & R2 ADDED TO NEW 195 PCB BJ 25-8-78	MD
1	RELEASED TO PROD'N 28-9-78	
2	ECO 784 RIBBON CABLE MODS BJ 6-12-78	MD
3	ECO 849 PCB MODS BJ 4.5.79	MD
4	ECO 867 PCB UPDATE BJ 11-6-79 & ECO 868 572130 UNMADE TO 572100/A 606006 CLIPS REMOVED & ECO 876 J3, 4 & 5 NEW GOLD NOT TIN	MD
5	ECO 952 26-10-79 PCB WAS 195 9A. BJ PINS OF J5 ADDED PCB CUT OUT INCREASED IN DEPTH	MD
6	ECO 1000 RIBBON CABLE ASSY WAS 572100/A IL 18/80	MD
7	ECO 1102 PCB WAS ISSUE 5 IL 16.4.80	MD
8	ECO 1217 RIBBON CABLE WAS 572130/B JR 18.8.81	MD

1 off CABLE CLIP (DATRON PART No 630023.)



CUT OFF PART SHOWN BY DOTTED LINE.
STICK ON OPPOSITE SIDE OF P.C.B. TO COVER SOLDER JOINTS OF J3 AS SHOWN DOTTED.

IMPORTANT

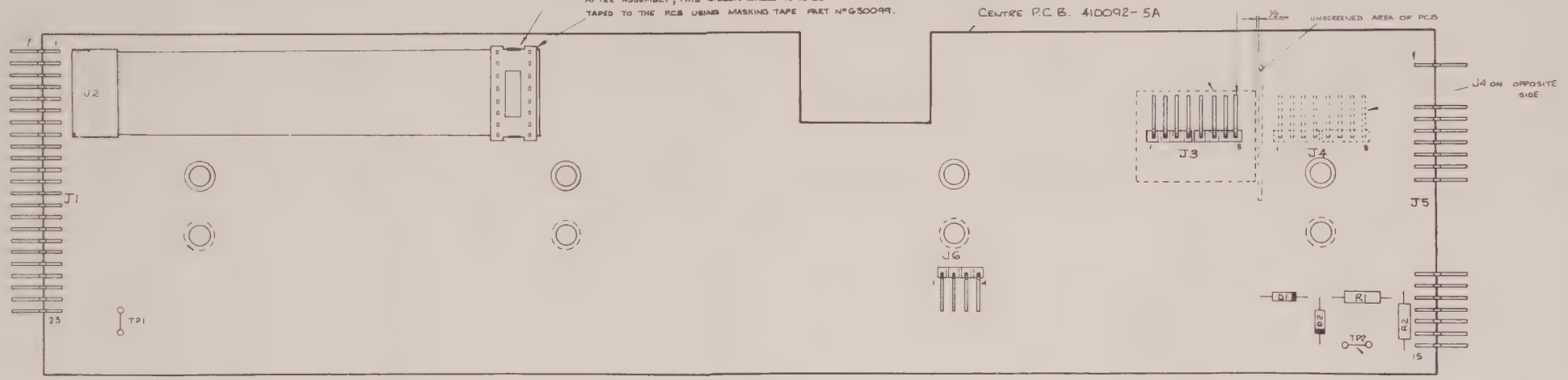
4 off AMP PIN (BLOCKS) PART No 604036 MUST BE AFFIXED FIRST
ENSURE ALL PINS ARE SEATED TIGHT & FLAT TO P.C.B. BEFORE SOLDERING
NOTE. PINS ARE HELD TOGETHER BY A PLASTIC STRIP. THIS STRIP IS TO BE CUT TO SUIT THE AMOUNT OF PINS REQUIRED

RIBBON CABLE ASSY 572115 /C

AFTER ASSEMBLY, THIS RIBBON CABLE IS TO BE TAPED TO THE PCB USING MASKING TAPE PART No G30099.

5 OFF GOLD RIGHT ANGLED PIN ASSY (PART No 604035) PLACED TOGETHER AS SHOWN BELOW.

CENTRE P.C.B. 410092-5A



DRAWN BJ	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
DATE 25-4-78	APPROVED DATE	SCALE 2:1 NOT TO BE SCALED		FINISH	TITLE 1061/1071. CENTRE P.C.B ASSEMBLY.	DRAWING No. 400296 SHEET 1 OF 2

DRAWING No. 430296

FIRST USED ON 1061 / 1071

THIRD ANGLE PROJECTION

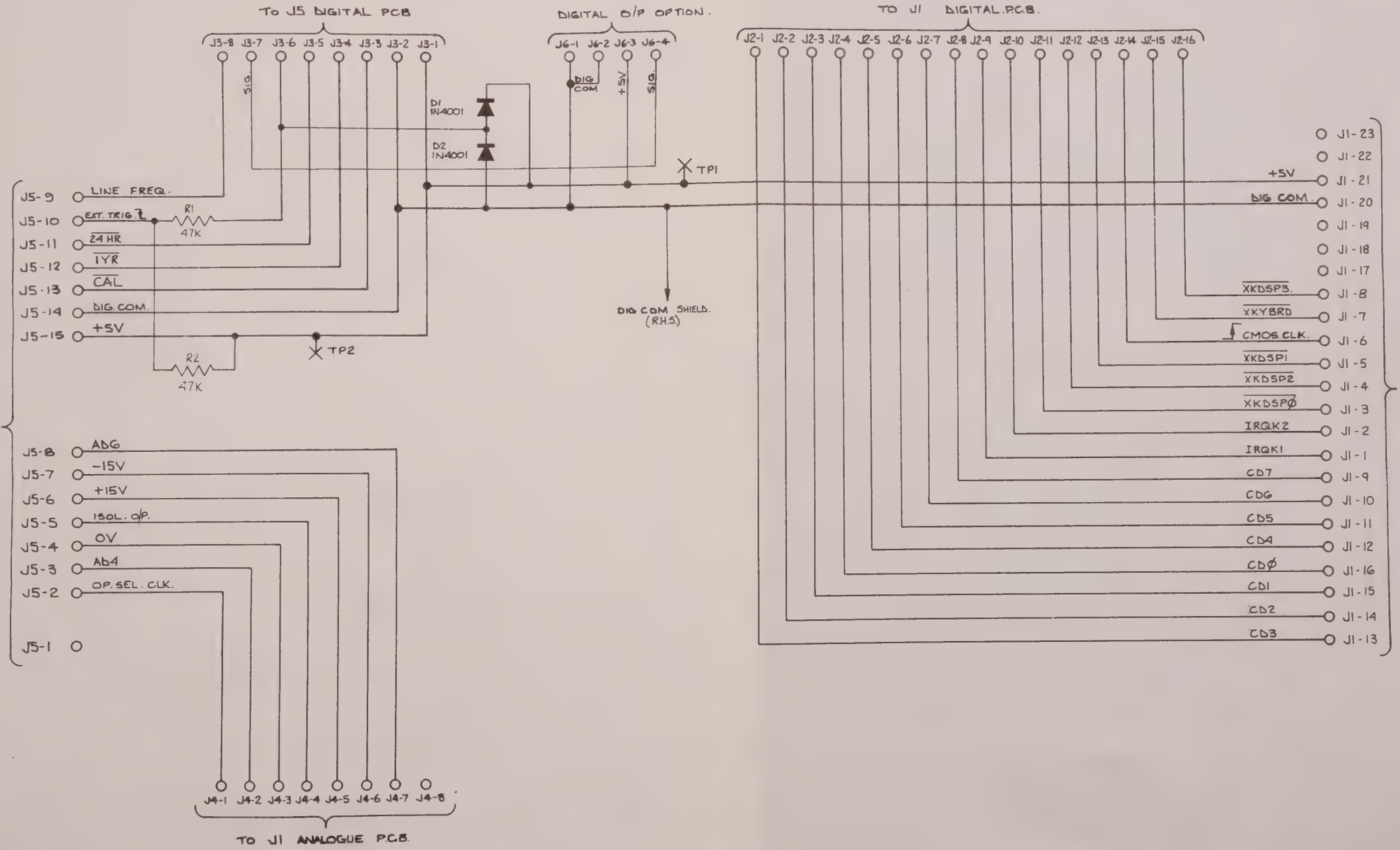
DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1. "IN GUARD" TRACKS TO BE ON CCT. SIDE (SHT. 2) & "OUT OF GUARD" TRACKS TO BE ON THE COMP. SIDE (SHT. 3) OF P.C.B. WHERE POSSIBLE.

BS	CHANGES
D	
1	RELEASED TO PRODN 29-9-78
2	ECO 849. J6-1 & 6 JOINED TO J5-7. B.J 4-5-79
3	ECO 892. B.J J5-8 ADDED & J5-1 &6 DELETED 29-10-79



DRAWN BJ.	CHECKED DCJ.	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ½° INCH DIMENSIONS: DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64. METRIC DIMENSIONS: DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm. UNLESS OTHERWISE STATED	MATERIAL / FINISH	DRAWING SIZE A2
TRACED	APPROVED	SCALE NOT TO BE SCALED			
DATE 30-5-78	DATE				

datron ELECTRONICS LTD. NORWICH.

TITLE: CENTRE PCB SCHEMATIC 1061 / 1071

DRAWING No. 430296

SHEET 1 OF 1

DRAWING No. 400297
FIRST SEC. No. 1061/71

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS	CHANGES
C	
D	NEW ISSUE PCB BJ 14-8-78 MD
1	RELEASED TO PRODN 20-8-78
2	ECO 867 PCB UPDATE BJ 11-6-79 AD

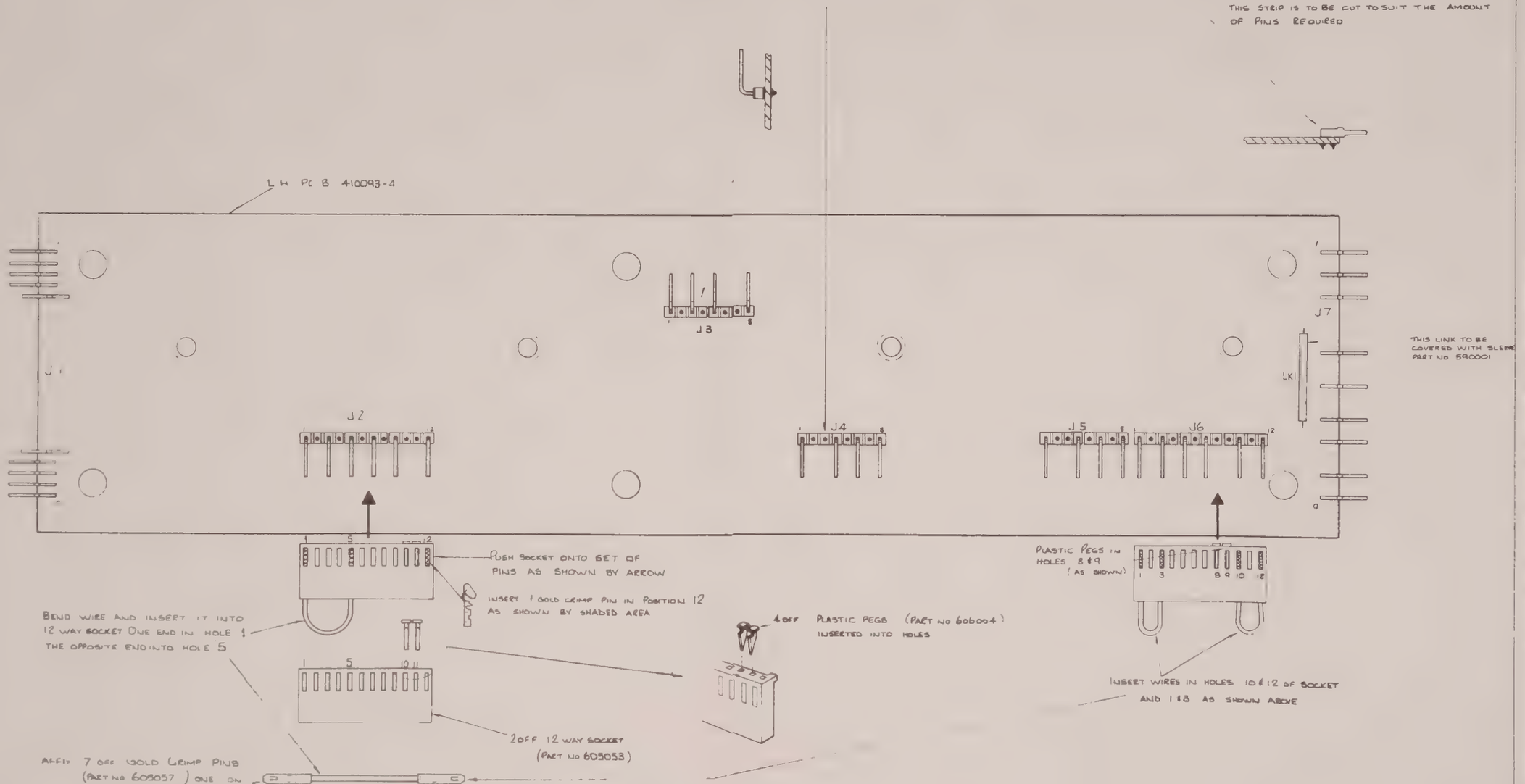
IMPORTANT

2 OFF AMP PINS (PART No 604086) MUST BE AFFIXED FIRST

ENSURE ALL PINS ARE SEATED TIGHT & FLAT TO PCB BEFORE SOLDERING

NOTE PINS ARE HELD TOGETHER BY A PLASTIC STRIP THIS STRIP IS TO BE CUT TO SUIT THE AMOUNT OF PINS REQUIRED

USE THE GOLD 4 RIGHT ANGLED PIN ASSY (PART NO 604035). 12 OFF PLACED TOGETHER TO MAKE UP THE REQUIRED AMOUNT OF CONTACTS (SHOWN BELOW)
REMOVE PINS IN PLACES SHOWN BY BLACK DOTS


L H PCB 410093-4
J1
J2
J3
J4
J5
J6
J7
LK1
THIS LINK TO BE COVERED WITH SLEEVE PART NO 590001
PUSH SOCKET ONTO SET OF PINS AS SHOWN BY ARROW
INSERT 1 GOLD CRIMP PIN IN POSITION 12 AS SHOWN BY SHADED AREA
BEND WIRE AND INSERT IT INTO 12 WAY SOCKET ONE END IN HOLE 1 THE OPPOSITE END INTO HOLE 5
4 OFF PLASTIC PEGS (PART NO 606004) INSERTED INTO HOLES
PLASTIC PEGS IN HOLES 8 & 9 (AS SHOWN)
INSERT WIRES IN HOLES 10 & 12 OF SOCKET AND 1 & 3 AS SHOWN ABOVE
2 OFF 12 WAY SOCKET (PART No 605053)
ALSO 7 OFF GOLD CRIMP PINS (PART No 605057) ONE ON EACH END OF WIRES, THE 7TH INTO PIN 12 OF SOCKET
3 OFF 40mm OF BROWN WIRE (PART No 510111) AND STRIP 3mm FROM EACH END (AS SHOWN)
40

DRAWN BJ	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS: DECIMAL TO 3 PLACES ± .002; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64. METRIC DIMENSIONS: DECIMAL TO 3 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm. UNLESS OTHERWISE STATED	ANGULAR ± °	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
DATE 21.4.78	APPROVED	SCALE 2/1 NOT TO BE SCALED			FINISH	TITLE 1061/71 L.H P.C.B ASSEMBLY	DRAWING No 400297 SHEET 1 OF

DRAWING No. 430297

FIRST USED ON 1061/1071

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1/ ALL CIRCUIT TO BE ON THE COMPONENT (SHEET 3) SIDE OF P.C.B WHERE POSSIBLE.

2/ INPUT GUARD, VIA J7-1 TO PROVIDE ELECTROSTATIC SHIELD ON 'CIRCUIT' (SHEET 2) SIDE OF P.C.B. WHERE POSSIBLE.

3/ B.S, VIA J3-5, TO ENCLOSE Hi AND I+ CIRCUITS ON P.C.B WHERE POSSIBLE.

4/ Ω GUARD VIA J3-3 TO ENCLOSE LO & I- CIRCUITS ON P.C.B WHERE POSSIBLE.

BSS.	CHANGES
D	
1	RELEASED TO PROD W/E 29-9-78

(PINS 1 & 3 AND 10 & 12 LINKED WHEN I OPTION IS NOT FITTED)

J2. I. P.C.B.

J6-12	J6-11	J6-10	J6-9	J6-8	J6-7	J6-6	J6-5	J6-4	J6-3	J6-2	J6-1
HI IN	HI OUT		B.S.		Ω GU		LO IN		LO OUT		

J3. I. P.C.B

J5-1	J5-2	J5-3	J5-4	J5-5	J5-6	J5-7	J5-8
I+		BS.		ΩGU		I-	

J2. AC. P.C.B

J4-8	J4-7	J4-6	J4-5	J4-4	J4-3	J4-2	J4-1
Ω GU		Ω GU		B.S.			HI

J6. ANAL. P.C.B.

J3-8	J3-7	J3-6	J3-5	J3-4	J3-3	J3-2	J3-1
Hi		BS.		Ω Gu			Lo

(PINS 1 & 5 LINKED WHEN Ω OPTION IS NOT FITTED)

J1. Ω P.C.B.

J2-1	J2-2	J2-3	J2-4	J2-5	J2-6	J2-7	J2-8	J2-9	J2-10	J2-11	J2-12
LO IN		I-		LO OUT		Ω GU		BS			I+

To J14 REAR PCB

J7-9 O Gu

J7-8 O I-

J7-4 O LO IN

J7-2 O Ω GU

J7-3 O BS

J7-5 O I+

J7-7 O Hi IN

J7-6 O

J7-1 O GU

To J1 FRONT PCB

O J1-10

O J1-9

O J1-8

O J1-7

BS O J1-6

GU O J1-5

O J1-4

O J1-3

O J1-2

O J1-1

L.H. GU. SHIELD

DRAWN	CHECKED
B.J.	
TRACED	APPROVED
DATE 30.5.78	DATE

DIMENSIONS IN MILLIMETRES

SCALE NOT TO BE SCALED

TOLERANCES ANGULAR ± ½°
INCH DIMENSIONS
DECIMAL TO 3 PLACES ± .005
DECIMAL TO 2 PLACES ± .010
FRACTIONAL ± 1/64
METRIC DIMENSIONS
DECIMAL TO 2 PLACES ± 1mm
DECIMAL TO 1 PLACE ± 2mm
WHOLE DIMENSIONS ± 4mm
UNLESS OTHERWISE STATED

MATERIAL

FINISH

datron ELECTRONICS LTD. NORWICH.

TITLE L.H. P.C.B. SCHEMATIC 1061/1071

DRAWING SIZE A2

DRAWING No. 430297

SHEET 1 OF 1

DRAWING No. 400298

FIRST USED ON 1061/71

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

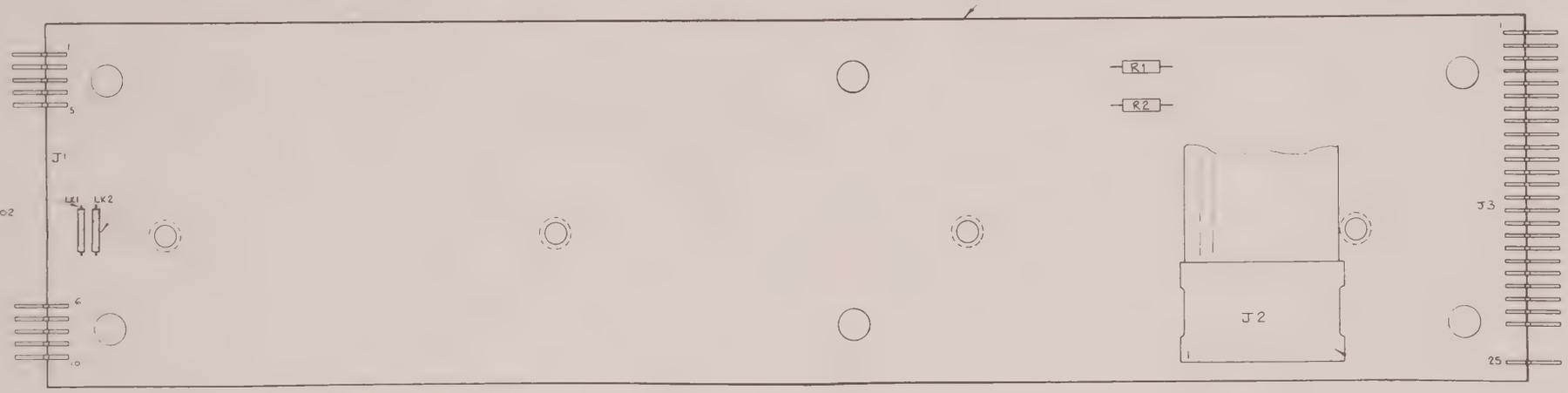
ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
C	
D	NEW ISSUE P.C.B. BJ 24-8-78
1	RELEASED TO PRODN 25-9-78.
2	ECO 850. 4-5-79 UPDATED PCB W1-6 WAS REMOVED BJ
3	ECO 867 & 904 BJ UPDATED PCB CABLE ASSY 400369 CHANGED TO 574270/A
4	ECO 943. 10-9-79 RIBBON CABLE ASSY WAS 574250/A BJ IL
5	ECO 1317 J2 WAS 400365 OR 18-8-81

LK1 & LK2 MUST BE COVERED WITH SLEEVE PART NO 59001

RIGHT HAND SIDE P.C.B 410094-A



LINKS USE 22 SWG TINNED CU WIRE DATRON PART No 540002

IMPORTANT

AMP PINS (DATRON PART No. 604036.) 4 OFF MUST BE AFFIXED TO P.C.B FIRST. ENSURE ALL PINS ARE SEATING TIGHTLY AND FLAT TO PCB BEFORE SOLDERING

NOTE PINS ARE HELD TOGETHER BY PLASTIC STRIP THIS STRIP IS TO BE CUT TO SUIT THE AMOUNT OF PINS REQUIRED

FOR EXAMPLE. ABOVE 2 BLOCKS OF 5 PINS ARE REQUIRED, THEREFORE STRIP OF 10 PINS TO BE CUT IN HALF

RIBBON CABLE ASSY
PART No 574270/C

NOTE WHEN SOLDERING CABLE PLUG INTO BOARD ENSURE THAT THE PLUG BODY SITS FLAT AGAINST PCB.

AFTER ASSEMBLING PCB WRAP THE ABOVE RIBBON CABLE ROUND THE PCB AND TAPE DOWN USING MASKING TAPE PART No 630099

DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL
BJ		MILLIMETRES	INCH DIMENSIONS ANGULAR ± °	
TRACED	APPROVED	SCALE	DECIMAL TO 1 PLACES ± .005	FINISH
DATE 20.4.78.	DATE	2:1 NOT TO BE SCALED	DECIMAL TO 2 PLACES ± .010	
			FRACTIONAL ± 1/64	
			METRIC DIMENSIONS	
			DECIMAL TO 2 PLACES ± 1mm	
			DECIMAL TO 1 PLACE ± 2mm	
			WHOLE DIMENSIONS ± 4mm	
			UNLESS OTHERWISE STATED	

datron ELECTRONICS LTD. NORWICH.

TITLE 1061/71. R.H. P.C.B. ASSEMBLY.

DRAWING No. 400298

DRAWING SIZE A1

SHEET 1 OF 2

DRAWING No. 430298

FIRST USED ON 1061*/1071

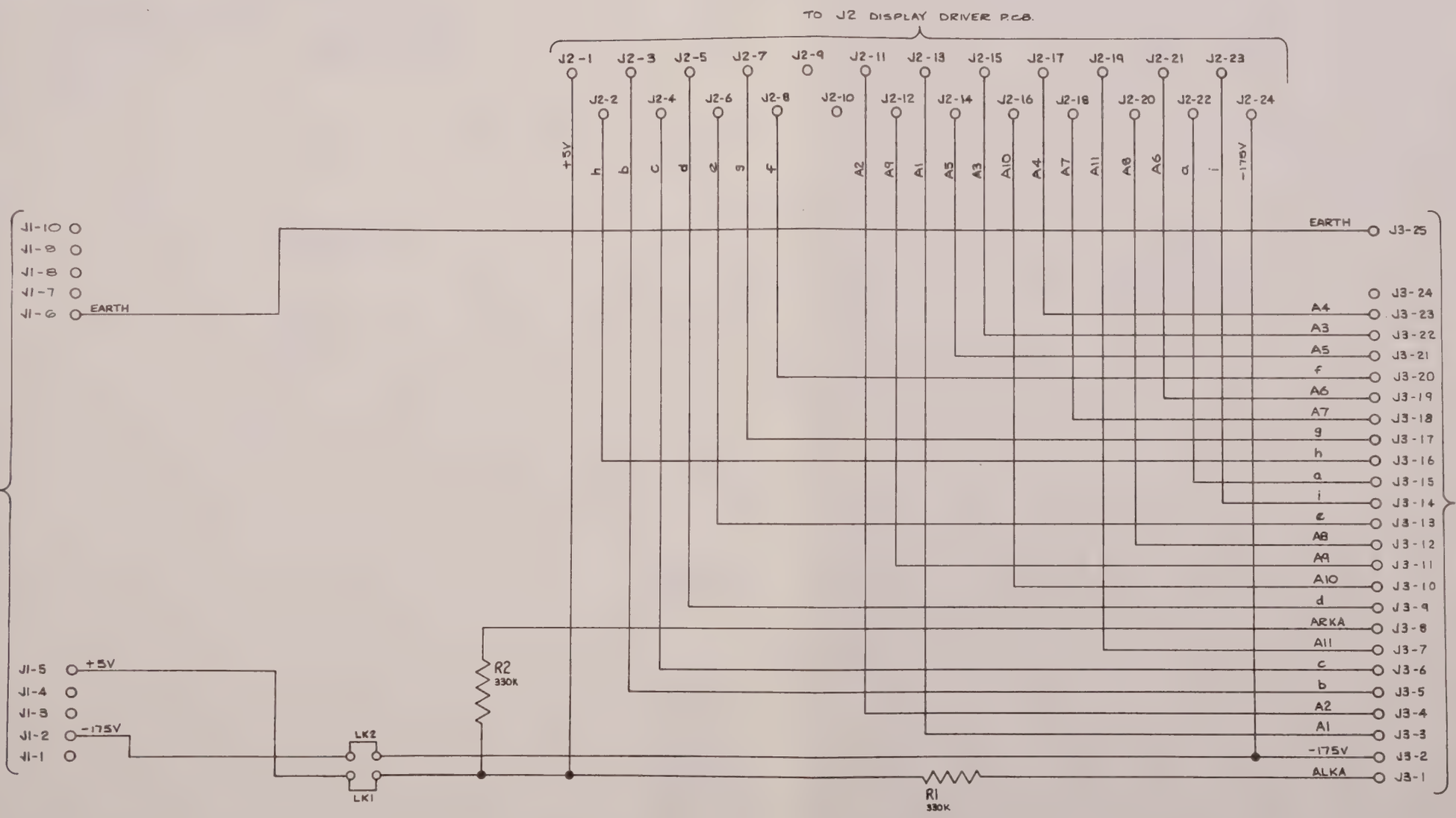
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
D	
1c	RELEASED TO PROD 20-5-78
2	DIG COM SCREEN REMOVED BJ SOD PROD 9-6-78



DRAWN B.J.	CHECKED D.G.	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ½° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm; UNLESS OTHERWISE STATED	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A2
TRACED	APPROVED			FINISH		
DATE 26-5-78	DATE	SCALE NOT TO BE SCALED			TITLE R.H. SIDE P.C.B. SCHEMATIC.	DRAWING No. 430298 SHEET 1 OF 1

DRAWING No. 400304

FIRST USED ON 1061/1071

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

CURRENT OPTION FUSE ASSEMBLY

- BROWN WIRE 60MM LONG & ONE END STRIPPED 3MM FOR GOLD CRIMP PIN FITTING.
- BROWN WIRE 70MM LONG & ONE END STRIPPED 3MM FOR GOLD CRIMP PIN FITTING.
- CRIMP TWO GOLD CRIMP PINS PART Nº 605057 - USING CRIMP TOOL Nº HTR 22632A FITTED INTO A 4 WAY POLARISED SOCKET (PINS 1 & 4) PART Nº 605051
- FUSE HOLDER 1 OFF PART Nº 920082, FUSE 1·6AMP 250V PART Nº 920071
- 2 OFF 15MM BLACK SLEEVING PART Nº 590001.

R25 NOTE

* IMPORTANT NOTE:
R25 RESISTOR TO BE FITTED LAST SO THAT RL3 & RL4 WIRING TO PCB CAN BE DONE WITH EASE.

OHMS GUARD LEAD DETAIL

70 MM FINAL LENGTH
PART Nº 400379/1

NYLATCH ASSEMBLY (4 POSITIONS)

NYLATCH PLUNGER PART Nº G17010 - 4 OFF
N.B FIT FROM COMPONENT SIDE OF PC BOARD
NYLATCH GROMMET PART Nº G17011 - 4 OFF

SECTION A-A. TYPICAL

MOUNT M1 M3 & M4 ON 16 WAY D.I.L SOCKETS PART Nº 605061 3 OFF

MOUNT M2 ON 14 WAY D.I.L SOCKET PART Nº 605060 1 OFF

FOR DIFFERENT MAKES OF R19 C7 MUST BE CHANGED ACCORDINGLY SEE SHT 3 FOR FULL DETAILS.

RETAIN RELAY TO BRACKET WITH 3-4BUNC NUT PART Nº G15005 & M2·5 WASHER PART Nº G13014 2 OFF EACH (2 POSITIONS)

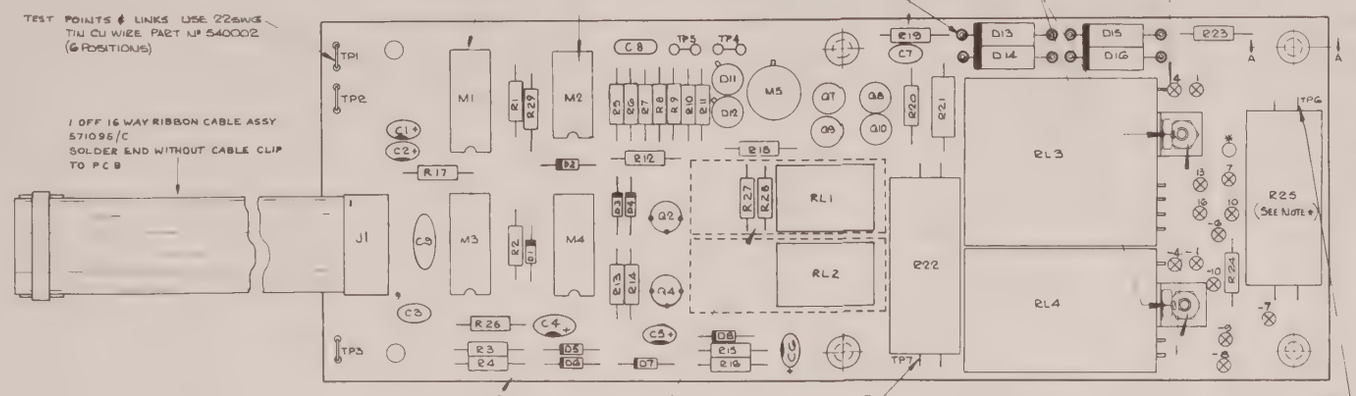
FIT D13-D16 ON STEATITE BEADS - 3 PER LEAD: G30024, 24 OFF

19 OFF PCB TERMINALS PART Nº G20003

12 WAY POLARISED SOCKET PART Nº 605053 1 OFF.

TEST POINTS & LINKS USE 22SWG TIN CU WIRE PART Nº 540002 (6 POSITIONS)

1 OFF 16 WAY RIBBON CABLE ASSY 571096/C SOLDER END WITHOUT CABLE CLIP TO PCB



FROM RL3 PIN 5 — H: IN
FROM RL3 PIN 6 — H: OUT
OHMS GRD FROM PCB * — Ω GUARD
FROM RL3 PIN 11 — LO 'N'
FROM RL3 PIN 12 — LO OUT
J2 — CONNECT J2 TO J6 ON L.H P.C BOARD

CRIMP TERMINAL 605056 3 OFF FOR BLANKING ONLY (MOLEX 4809 TIN)

FROM RL3 PIN 15 — I-
— Ω GU
— B3
FROM RL3 PIN 9 — I+
J3 — CONNECT J3 TO J5 ON L.H P.C BOARD

USE R22 LEAD AS T P7

USE R25 LEAD AS TP6

8 WAY POLARISED SOCKET PART Nº 605052 - 1 OFF

PRINTED CIRCUIT BOARD PART Nº 410104-5

R27 + 28 ARE NOT USED WITH OMRON ALTERNATIVES

WIRING DETAILS RL3

ALL WIRES TO BE 7/2 PTFE COVERED - WHITE PART Nº 540008. LENGTHS AS BELOW

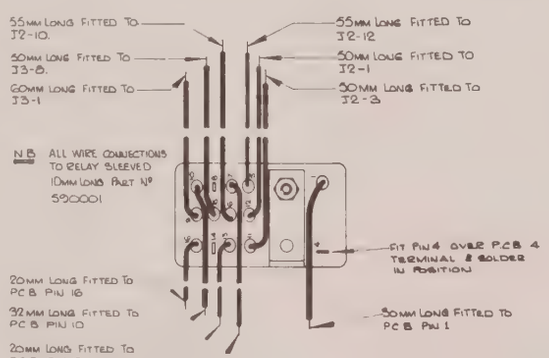
RETAIN RELAY BRACKETS

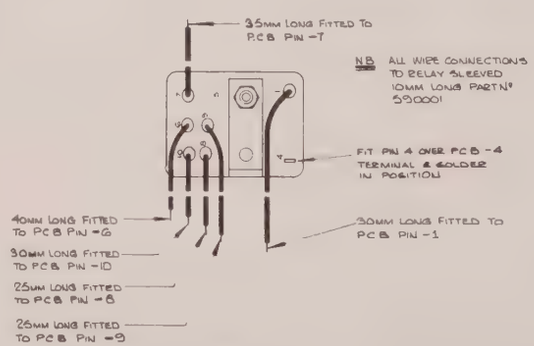
TO P.C.B WITH 2 × M3 × 6 POZI PAN SCREWS PT Nº G11004
2 × M3 FULL NUT PT Nº G15002
& 2 × M3 SHAKEPROOF WASHERS PART Nº G13005

WIRING DETAILS RL4

ALL WIRES TO BE 7/2 PTFE COVERED - WHITE PART Nº 540008. LENGTHS AS BELOW

FIT MOLEX TERMINALS 4809 GOLD PART Nº 605057 6 OFF USING CRIMP TOOL Nº HTR 22632A


55MM LONG FITTED TO J2-10.
50MM LONG FITTED TO J3-8.
60MM LONG FITTED TO J3-1
55MM LONG FITTED TO J2-12
50MM LONG FITTED TO J2-1
50MM LONG FITTED TO J2-3
NB ALL WIRE CONNECTIONS TO RELAY SLEEVED 10MM LONG PART Nº 590001
FIT PIN 4 OVER PCB 4 TERMINAL & SOLDER IN POSITION
20MM LONG FITTED TO PCB PIN 16
32MM LONG FITTED TO PCB PIN 10
20MM LONG FITTED TO PCB PIN 13
30MM LONG FITTED TO PCB PIN 7
50MM LONG FITTED TO PCB PIN 1


35MM LONG FITTED TO P.C.B PIN -7
NB ALL WIRE CONNECTIONS TO RELAY SLEEVED 10MM LONG PART Nº 590001
FIT PIN 4 OVER PCB -4 TERMINAL & SOLDER IN POSITION
40MM LONG FITTED TO PCB PIN -6
30MM LONG FITTED TO PCB PIN -10
25MM LONG FITTED TO PCB PIN -8
25MM LONG FITTED TO PCB PIN -9
30MM LONG FITTED TO PCB PIN -1

ISS	CHANGES
A	17 JULY 79 WGS
B	C1 POSITION CHANGED PCB WAS ISSUE 2. R2 & C6 VALUES CHANGED WGS 21 AUG 79
C	STEATITE BEADS ADDED, TO MOUNT D13-D16 24 OFF IL 24.9.79
1	RELEASED TO PRODUCTION 26.9.79
2	ECO 572, 587 RL3 & RL4 WERE 1 TT RELAY WIRING WAS P.V.C BJ 25-10-79
3	ECO'S 1000, 1012, 1037 & 1038 RIBBON CABLE CLIP WAS 606007 CABLE WAS 571080/A FUSE HOLDER WAS 920047 C7 WAS 2n2F LK1 ADDED R8, R9, D9, D10, Q5 & Q6 DELETED BJ 4-1-80
4	ECO 1048 R26-R28 ADDED R 17 1 80
5	ECO 1089, 1110, 1087 J2-7 J3-4 + J3-6 WERE 605057 D17 + D18 REMOVED C8 ADDED IL 18 4 80
6	ECO. 1116 R29 ADDED CUT TRACK ON PCB BETWEEN M2 & 4-11-9 PARTS LIST CHANGE TO C8 IL 3.6.80
7	ECO 1189 OHMS GUARD LEAD WAS 400379/2 IL 17 12 80
8	ECO 1080 R8, 9, C9 ADDED R 12 WAS 1K R 13, 7 WERE 12K R 5, 6, 14 WERE 27K R 26, 27, 28 WERE 10K R 17 WAS 1M Q1, Q3, ANI, LK1 DELETED JR 25 2 81
9	ECO 1217 J1 WAS 18 WAY SOCKET JR 18 8 81

DRAWN W G SMITH	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm; UNLESS OTHERWISE STATED; ANGULAR ± °	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
TRACED	APPROVED	SCALE NOT TO BE SCALED		FINISH	TITLE CURRENT PC BOARD LAYOUT 1061/1071	DRAWING No. 400304
DATE 16 JULY 79	DATE					SHEET 1 OF 7

DRAWING No 430304

FIRST USED ON 1061/1071

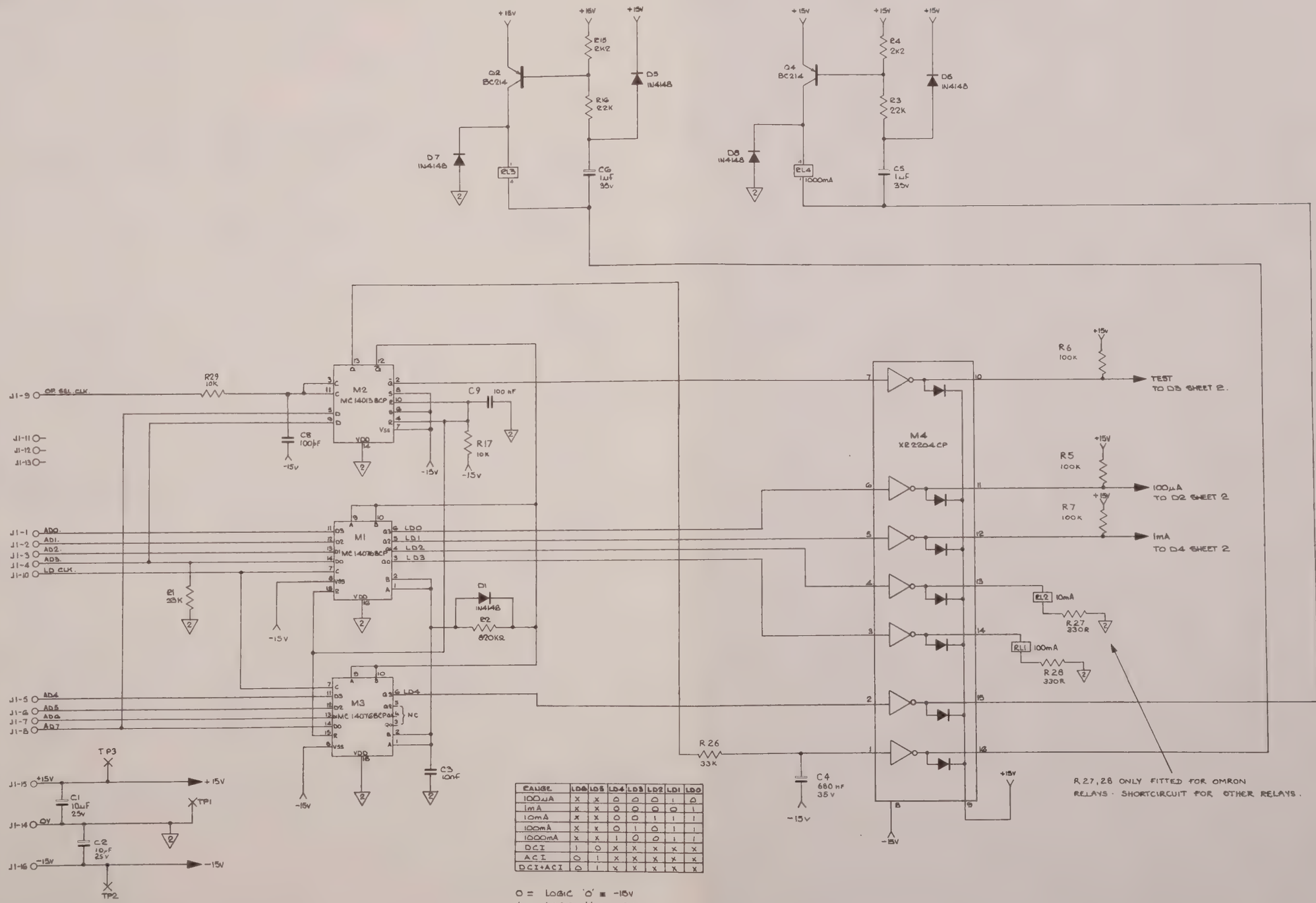
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURR TO BE REMOVED

NOTES

CHANGES		
A	18 JULY 79 WGS	
B	RP WAS 1M Ω - 000105 C4 WAS 10nF 250v C6 D6 0.03 WGS 2 AUG 79	MD
1	RELEASED TO PRODUCTION 24.9.79	
2	ECO 1087 & 1088 SEE SHEET 2.	MD
3	SEE SHEET 2 ECO. 1048 11.___ 18.1.80	MD
4	ECO 1087. 1110 C8 ADDED 11.___ 14.4.80	MD
5	ECO 1116 R29 ADDED. C8 WAS 1nF 11.___ 3.6.80	MD
6	ECO 1080 R19, R14, Q1, Q3 * AN 1 DELETED R5 - 7C4 MOVED C9 R17 R26 - R28 ADDED JR 26.2.81	MD



GAUGE	LD6	LD5	LD4	LD3	LD2	LD1	LD0
100μA	X	X	0	0	0	1	0
1mA	X	X	0	0	0	0	1
10mA	X	X	0	0	1	1	1
100mA	X	X	0	1	0	1	1
1000mA	X	X	1	0	0	1	1
DCI	1	0	X	X	X	X	X
ACI	0	1	X	X	X	X	X
DCI+ACI	0	1	X	X	X	X	X

0 = LOGIC '0' = -15V
1 = LOGIC '1' = 0V
X = DONT CARE CONDITION

W.G.SMITH DATE 20 JULY 79

DIMENSIONS IN MILLIMETRES

NOT TO BE SCALED

TOLERANCES UNLESS OTHERWISE STATED
INCH DIMENSIONS
DECIMAL TO 3 PLACES ± .005
DECIMAL TO 2 PLACES ± .010
FRACTIONAL ± 1/64
METRIC DIMENSIONS
DECIMAL TO 3 PLACES ± 1mm
DECIMAL TO 1 PLACE ± 2mm
WHOLE DIMENSIONS ± 4mm
ANGULAR ± °

MATERIAL

FINISH

datron ELECTRONICS LTD. NORWICH.

TITLE CURRENT PC BOARD CIRCUIT DIAGRAM 1061-1071

DRAWING SIZE A1

DRAWING No 430304

SHEET 1 OF 2

DRAWING No 430304

FIRST USED ON 1061/1071

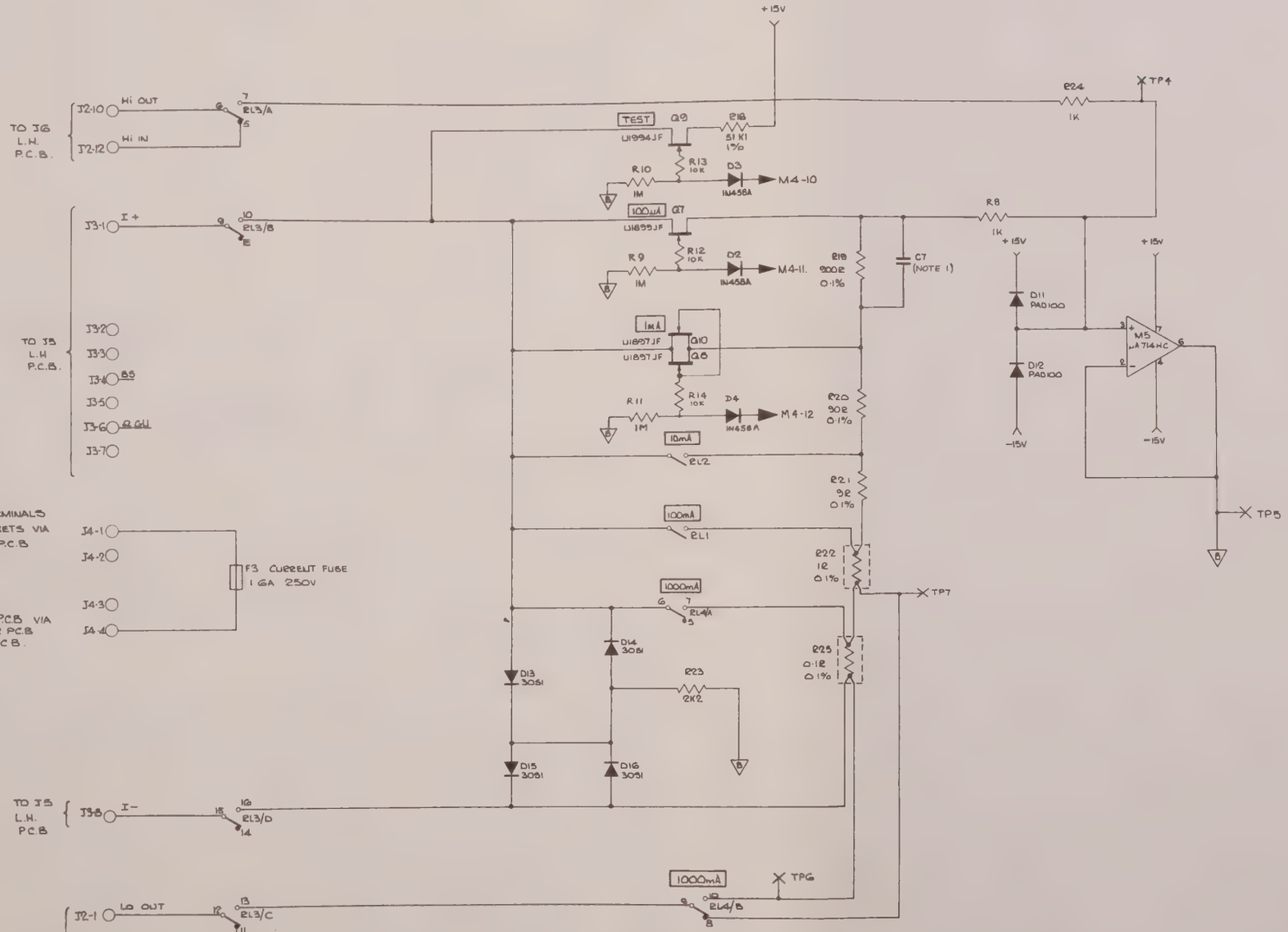
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES
1 470pF IF R19 MANUFACTURED BY MANN COMP
330pF " " " " KELVIN

ISS	CHANGES
A	18 JULY 79 WGS
B	SEE SHT 1
1	RELEASED TO PRODUCTION 24.9.79
2	ECO. 1037 & 1038 C7 WAS 2n2F E8,E9,E3,D10,Q8, Q46 DELETED. S.J. 4-1-80
3	ECO 1048 R26-R28 ADDED 18 1 80
4	ECO 1087 D17 D18 REMOVED 14.4.80
5	SEE SHEET 1
6	ECO 1080 R12-14 TRACKED IN TO P.C.B. DESIGNATORS REDEFINED. JR 26.2.81



W.G.SMITH	DRAWN	DIMENSIONS MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm; UNLESS OTHERWISE STATED; ANGULAR ± °	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
	APPR'D	SCALE NOT TO BE SCALED		FINISH	TITLE CURRENT P.C. BOARD CIRCUIT DIAGRAM - 1061-1071	DRAWING No 430304 SHEET 2 OF 2
	DATE 18 JULY 79.					

DRAWING No 400306

FIRST USED ON 1061/1071

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS	CHANGES
1	RELEASED TO PRODUCTION 18 MAY 79 W.G.S
2	ECO 1008 26-10-79 RB ADDED BJ
3	ECO 1000 1052 SOCKET CLIP FOR J2 WAS 608007 PIN A 4 LK1/LK2 ADDED IL 18.1.80
4	ECO 1178 PCB WAS ISSUE 4 IL 14.10.80
5	ECO 1198 603058 CRIMPS ADDED TO J4 JR 25 2 81
6	ECO 1217 J3 WAS 24 WAY SOCKET JR 18-8-81

FIT CRIMP TERMINALS TO J4 - 2 OFF 605056

J4

4 WAY CONNECTOR PART Nº 605051

1 OFF RIBBON CABLE ASSY PART NO 573120/C SOLDER END WITHOUT CABLE CLIP TO BOARD.

J1 24 WAY D.I.L SOCKET PART Nº 605064

CRIMP LEADS PART Nº 400579/1 (2 OFF)

J2 16 WAY D.I.L SOCKET PART Nº 605002

2 OFF SOCKET CLIP PART Nº 606005

M4 MOUNTED ON 24 WAY D.I.L SOCKET PART Nº 605064.

M1 TO M3 M5 TO M9 M11 TO M13 & M17 ARE MOUNTED ON 16 WAY D.I.L. SOCKETS PART Nº 605061 (12 OFF)

LK1/LK2 MADE FROM 22 SWG BTC WIRE 540002 & SLEEVED 580004. FIT LK2 IN PLACE OF LK1 WHEN REMOTE CAL. FACILITY IS REQD.

PIN A

SOLDER PIN 620003

* NYLATCH PLUNGER 617010 - 8 OFF

* NYLATCH GROMMET 617011 - 6 OFF

(SECTION A-A TYPICAL)

M10 MOUNTED ON 40 WAY D.I.L SOCKET PART Nº 605050 (1 OFF)

M14 & M15 M18 & M19 ARE MOUNTED ON 14 WAY D.I.L SOCKETS PART Nº 605060 (4 OFF)

M16 & M20 MOUNTED ON 22 WAY D.I.L SOCKET PART Nº 605063 (2 OFF)

TP1 TO TP6 MADE FROM 22 SWG B.T.C. WIRE PART Nº 540002. (6 OFF)

PRINTED CIRCUIT BOARD PART Nº 410101-4A

CIRCUIT DIAGRAM = 430306-3

DRAWN W G SMITH	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ~ 4mm UNLESS OTHERWISE STATED ANGULAR ± °	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
TRACED	APPROVED	SCALE NOT TO BE SCALED		FINISH	TITLE IEEE 488 OPTION P.C.B ASSEMBLY 1071. 1061	DRAWING No 400306 SHEET OF
DATE 26th APRIL 79	DATE 18 MAY 79					

DRAWING No 430306

FIRST USED ON 1061/1071

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ISS.	CHANGES
1	RELEASED TO PRODUCTION 18 MAY 79 W.G.S
2	ECO 10068 26-10-79 R5 ADDED B
3	ECO 1082 PIN A 4 LK1/LK2 ADDED 18.1.80

J3

IRQ10

ADDRESS BUS

DATA BUS

Φ2

R/W

TP6

TP5

TO J3 DIGITAL PCB

M16 6501-9

M4 TMS2532

M20 6501-9

M10 MC68488P

M17 MC14538BCP

R4 100K

C1 0·1µf

R5 10K

C2 1µf

R6 100K

RESET

VDD

TRIG

CS

DMA REQ

VSS

ASE

DMA GRANT

T/R2

T/R1

RS0

RS1

RS2

J2 X108D

TP1

J2

ASSY 400346

AN3

LK2

LK1

ASSY 400363

J1

J27

R1 100K

R3 100K

R2 100K

R8 10K

R7 100K

AN2-6

AN2-3

AN2-8

AN2-4

ANI-5

ANI-7

ANI-6

AN2-2

ANI-8

ANI-2

ANI-3

ANI-4

AN2-5

DIO1

DIO2

DIO3

DIO4

DIO5

DIO6

DIO7

DIO8

DAV

NRFD

NDAC

EOI

SRQ

REN

IFC

ATN

DIG COM

PIN A

TO J6 CENTRE PCB

J4-3 +5V

J4-1 DIG COM

TP2

TP3

TP4

C3 10nF

C4 10 µf

C5 10 µf

C6 10 µf

C7 10 µf

DRN W.G.SMITH.	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
TRACED	APPROVED	SCALE NOT TO BE SCALED		FINISH	TITLE IEEE 488 OPTION CIRCUIT DIAGRAM.	DRAWING No. 430306 SHEET 1 OF 2
DATE 25th APRIL 79	DATE 18 MAY 79.					

DRAWING No.	
430306	
FIRST USED ON	
1061/1071	

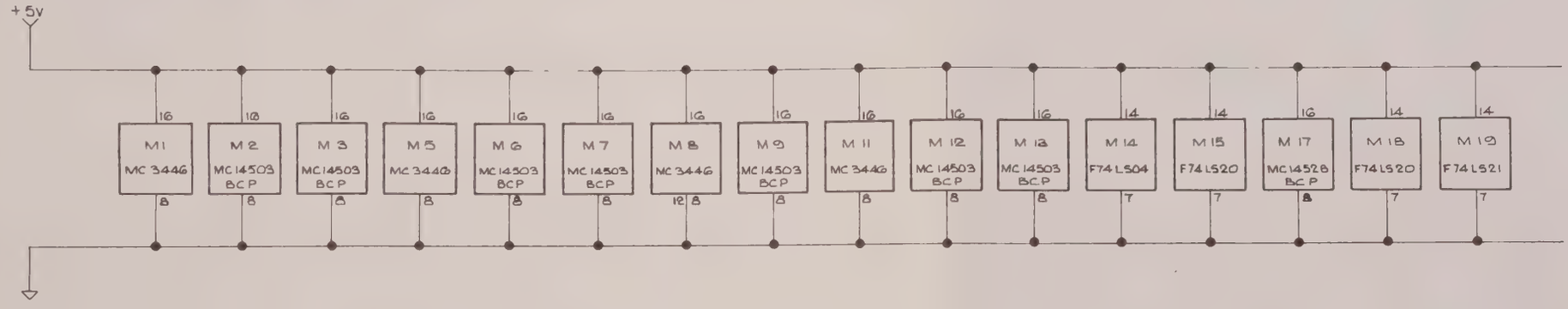
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

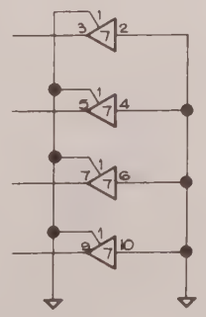
ALL BURRS TO BE REMOVED

NOTES

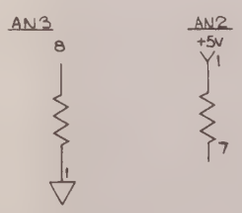
ISS.	CHANGES
A	FIRST ISSUE. 9 MAY 79 W.G.S.
1	RELEASED TO PRODUCTION 18 MAY 79. W.G.S.
2	ECO 1008 B.J. R.B. ADDED 26-10-79
3	SEE SHEET 1



UNUSED GATES M7



UNUSED RES. NETWORKS



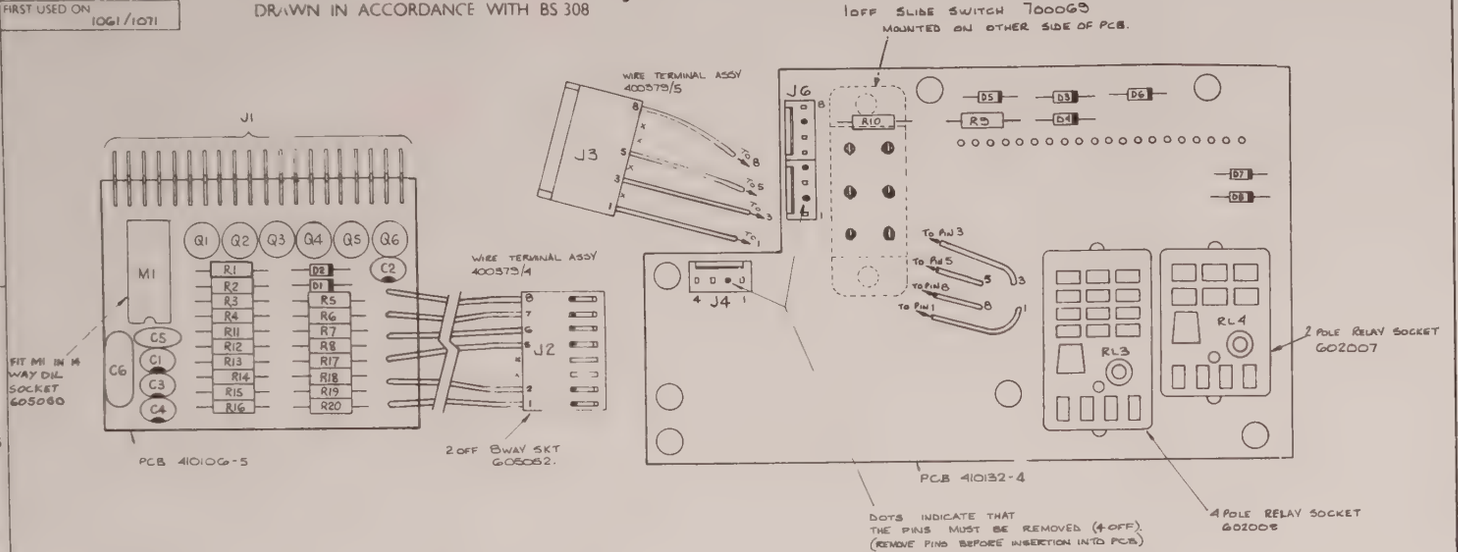
DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES ANGULAR ± ½°	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE
W.G.SMITH.	B.C.M.	MILLIMETRES	INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm; UNLESS OTHERWISE STATED			A2
TRACED	APPROVED	SCALE		FINISH	TITLE I.EEE 488 OPTION CIRCUIT DIAGRAM	DRAWING No. 430306
DATE 25 APRIL 79.	DATE 18 MAY 79.	NOT TO BE SCALED				SHEET 2 OF 2

DRAWING No. 400307

FIRST USED ON 1061/1071

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308



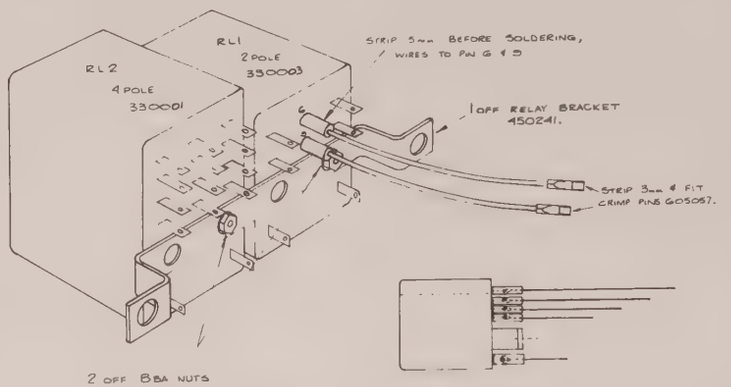
ALL BURRS TO BE REMOVED

NOTES

IMPORTANT.

FOR CRIMP PINS USE TOOL Nº HTR 22G2A.

No.	CHANGES	
A		
1	RELEASED 26-3-79	
2	LK1 REPLACED BY R10 400100. DS DELETED E.C.O. 1002/1007 5 JUNE 79 W.D.S.	MD
3	ECO 872. 25-10-79 RL1, RL2, RL3 & RL4 WERE ITT. B.J.	MD
4	ECO 981 6-11-79 R9 WAS 33K. B.J. R10 WAS 100Ω R11 & R12 ADDED D7 ADDED D5 DELETED 400379/4 IsSt ADDED. PCBs UP-DATED	MD
5	ECO 1021 1034 R15 MOVED & WAS 33K NOW 1M. LK1 ADDED D7 & R10 DELETED R9 WAS 10K. B.J. 9-1-80	MD
6	ECO 1085 POLARISING KEY FOR J3 REMOVED. J4 WAS 8 WAY CONN J5 REMOVED - SEE SHEET 2 IL 22-4-80	MD
7	ECO 1166 1154 R1 WAS 12K R10 R13 R14 R15 R16 R17 R18 R19 R20. C3 C4. C5. C6. D5 D6 D7 D8 D9. C6 & LK1 ADDED IL 24-9-80	MD
8	ECO 1199 R10 WAS 12K JR 24-2-81	MD


RL1
2 POLE 330003
RL2
4 POLE 330001
STRIP 5mm BEFORE SOLDERING, WIRES TO PIN 6 & 5
1 OFF RELAY BRACKET 450241.
STRIP 3mm & FIT CRIMP PINS 605057.
2 OFF 8BA NUTS G15001
2 OFF SHAKEPROOF WASHER G13005

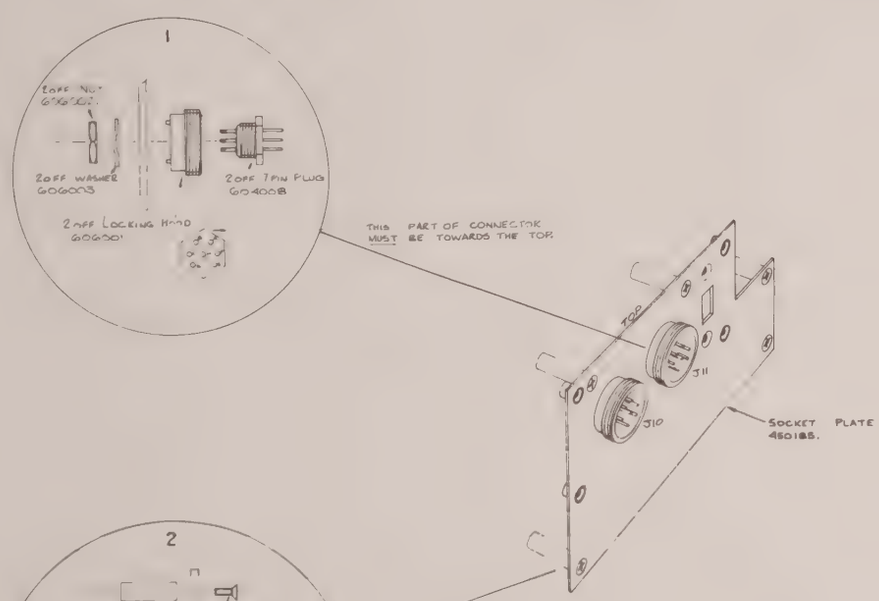
PROCEDURE.

1/ FIT BOTH RELAYS TO THE BRACKET (AS SHOWN) WITH WASHER & NUT.

2/ ON PINS 6 & 5 OF THE TWO POLE RELAY SOLDER 70mm OF WHITE WIRE PART No 540008 SLEEVE WITH ½ PIECE OF 530001 (1¢ 10mm).

3/ ALL OTHER CONTACTS ARE TO HAVE APPROXIMATELY 60mm OF 22 SWG TINNED COPPER WIRE PART Nº 540002 & SLEEVE EACH WITH ½ PIECE OF 530001.

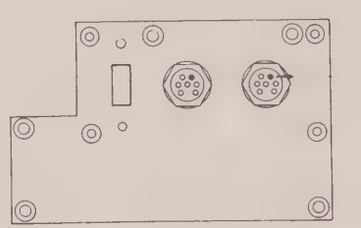
4/ STAGGER LENGTHS OF TINNED COPPER WIRE, TO ASSIST FITTING TO PCB. AS SHOWN.

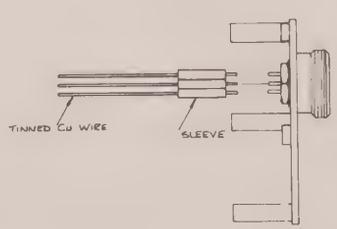


PROCEDURE.

1/ ASSEMBLE THE 7 PIN PVC PLUGS FIRST & ENSURE THAT THE CONNECTORS ARE SECURED IN THE POSITION SHOWN.

2/ ASSEMBLE THE 5 STANDOFF'S IN THE POSITION SHOWN BY THE LARGE DOTS.





PROCEDURE

1/ ALL PINS ON EACH SOCKET EXCEPT 'PIN B' (SHOWN SOLID), SOLDER ON 60mm OF TINNED COPPER WIRE PART Nº 540002 & SLEEVE ALL JOINTS WITH APPROXIMATELY 16mm OF SLEEVING PART No 530001.
THERE SHOULD NOW BE 12 WIRES.

B.J. APPROVED DATE 23-2-79

DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED. NOT TO BE SCALED

TOLERANCES	ANGULAR ± °
INCH DIMENSIONS	
DECIMAL TO 2 PLACES ±	.005
DECIMAL TO 2 PLACES ±	.010
FRACTIONAL ±	1/64
METRIC DIMENSIONS	
DECIMAL TO 2 PLACES ±	1mm
DECIMAL TO 1 PLACE ±	2mm
WHOLE DIMENSIONS ±	4mm

MATE AL

FINIS

datron ELECTRONICS LTD. NORWICH.

TITLE REAR INPUT / RATIO ASSY

DRAWING No. 400307

DRAWING SIZE A1

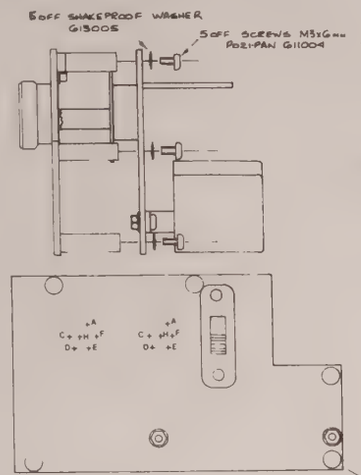
SHEET 1 OF 8

DRAWING No 400307.

FIRST USED ON 1061/71

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308



3. BOTTOM VIEW SHOWS THE HOLES IN THE P.C.B (INDICATED BY CROSSES). THESE HOLES ARE FOR THE WIRES FROM THE TWO 7 PIN SOCKETS
IT IS A SUGGESTION THAT THE WIRES ARE STAGGERED TO MAKE ASSY EASIER (AS WIRING THE RELAYS).

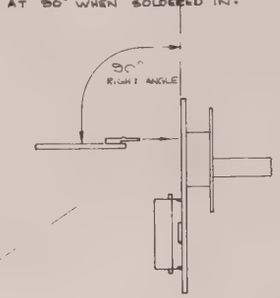
PROCEDURE:

① THE WIRES SHOULD LINE UP WITH THE APPROPRIATE HOLES. IE. WIRE FROM PIN A OF SOCKET SHOULD BE INSERTED INTO HOLE 'A', WIRE FROM PIN 'C' TO HOLE 'C' AND SO ON.

② WHEN THE WIRES ARE INSERTED IN THE APPROPRIATE HOLES. SECURE THE 2 ASSYS TOGETHER WITH THE M3 X 6mm POZI-PAN SCREWS & SHAKEPROOF WASHERS; SCREWED IN THE 5 STANDOFFS. (AS DETAILED)

③ LIGHTLY PULL ON THE TIN COPPER WIRES SO THE WIRE IS TAUT; THEN SOLDER & CROP IN THE USUAL MANNER.

2. INSERT CONNECTORS AS SHOWN.
SOLDER ALL 20 AMP PINS & CROP LEGS IN USUAL MANNER.
THE BOARD IS TO BE AT 90° WHEN SOLDERED IN.



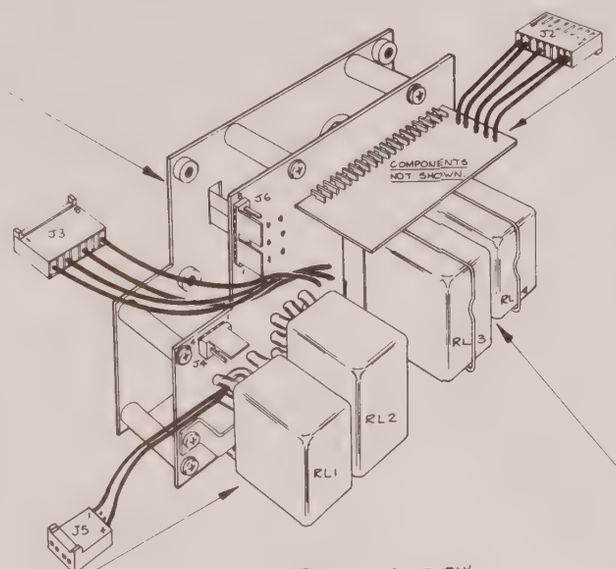
1. SKETCH BELOW SHOWS THE 2 RELAY & BRACKET ASSEMBLY (FROM SHEET 1). THE CROSSES INDICATE HOLES IN THE PCB INTO WHICH THE WIRES FROM THE RELAYS ARE INSERTED.

PROCEDURE

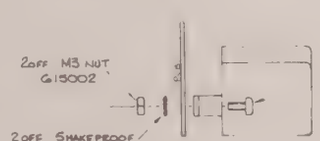
① INSERT THE WIRES INTO THE APPROPRIATE HOLES IN THE PCB (WIRES CUT AT DIFFERENT LENGTHS TO AID ASSEMBLY).

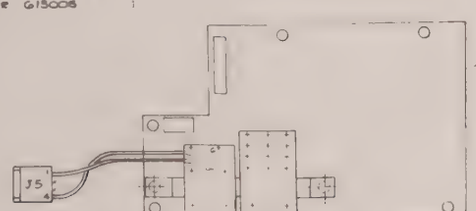
② WHEN THE WIRES ARE ALL IN PLACE SECURE THE BRACKET TO THE PCB USING THE SCREWS, WASHERS & NUTS SHOWN BELOW.

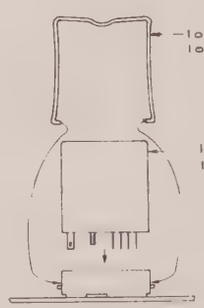
③ SOLDER & CROP WIRES IN THE USUAL MANNER. INSERT THE CRIMP PINS INTO SOCKET J5 PIN 6 OF RELAY TO PIN 6 OF J5 & PIN 3 TO PIN 1 AS SHOWN BELOW



FINISHED ASSEMBLY.







4. THE LAST PROCEDURE IS TO PLUG IN THE 4 & 2 POLE RELAYS & HOLD IN PLACE BY THE CLIPS PROVIDED AS DETAILED IN ABOVE SKETCH & FINISHED VIEW.

NOTES

	CHANGES
A	
1	RELEASED 26-3-79
2	ECO 1080 SEE SHT 1 5 JUNE 79 W.G.S
3	SEE SHT 1 25-10-79 B.J.
4	SEE SHT 1 6-11-79 B.J.
5	SEE SHT. 1 2-1-80 B.J.
6	ECO 1085 J5 WAS 8 WAY CONN. IL 22-6-80
7	SEE SHEET 1 24.9.80
8	SEE SHEET 1 24.2.81

B.J. APPROVED DATE 2-3-79

DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED NOT TO BE SCALED

TOLERANCES
INCH DIMENSIONS
DECIMAL TO 3 PLACES ± .005
DECIMAL TO 2 PLACES ± .010
FRACTIONAL ± 1/64
METRIC DIMENSIONS
DECIMAL TO 2 PLACES ± 1mm
DECIMAL TO 1 PLACE ± 2mm
WHOLE DIMENSIONS ± 4mm
UNLESS OTHERWISE STATED
ANGULAR ± °

MATERIAL —

FINISH —

datron ELECTRONICS LTD. NORWICH.

TITLE REAR INPUT / RATIO ASSY.

DRAWING SIZE A1

DRAWING No. 400307

SHEET 2 OF 8

DRAWING No. 430307

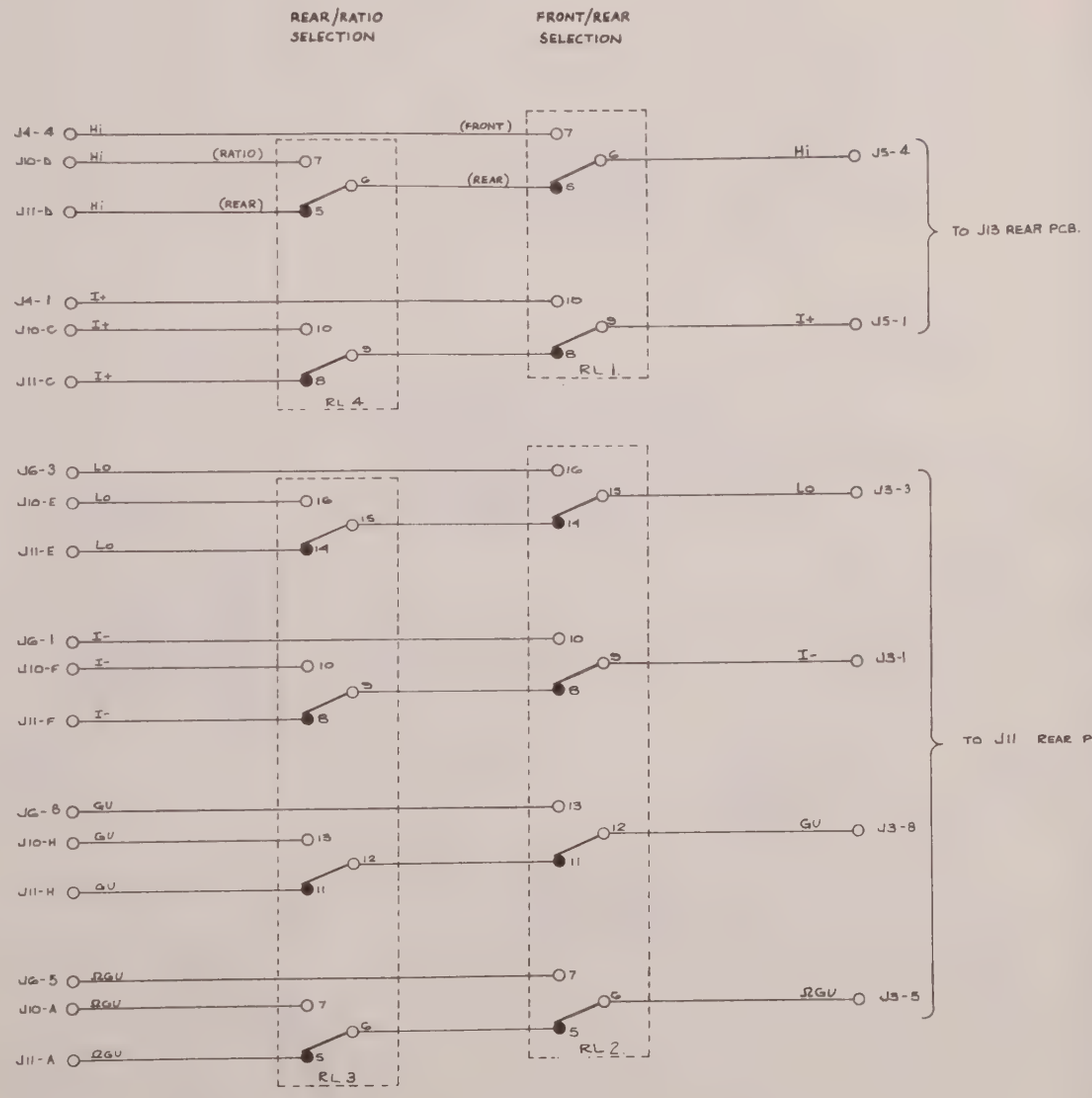
FIRST USED ON 1061/1071

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

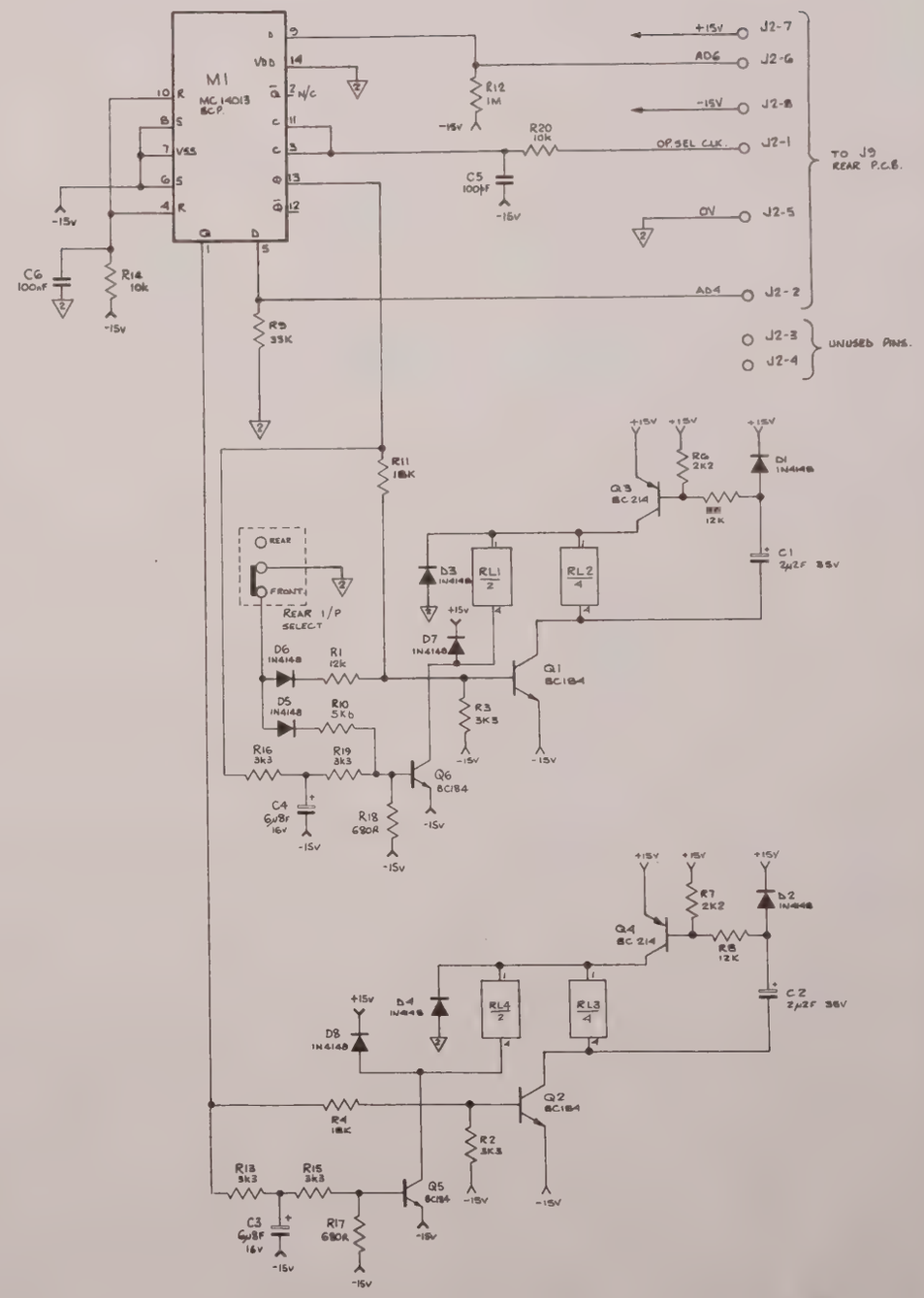
NOTES



NOTE: J4 & J6 ARE FROM THE FRONT PANEL TERMINALS.

J10. IS THE RATIO INPUT SOCKET ON REAR PANEL.

J11. IS THE REAR INPUT SOCKET ON REAR PANEL.



CHANGES
1 RELEASED 26-3-79
2 JK REPLACED BY R10 10K D6 DELETED ECO 802, 887 5 JUNE 79 W.S.
3 ECO 981 6-11-79. B.J. R9 WAS 33K R10 " 10K R11 & R12 ADDED D7 ADDED 10 OFF 400579/4 ADDED D5 DELETED
4 ECO 1091 & 1094 B.J. R19 WAS JOINED to J2-6 & M1-14 LK1 ADDED R9 WAS 18K D7 & R10 DELETED 2-1-80
5 ECO 1086 BS_ BETWEEN J4-1 & J5-1 REMOVED PINS OF J4 & J5 RE-NUMBERED PCBS, 4 WAY CONNECTORS 22.4.80
6 ECO 1166, 1154 R1 WAS 18K R10 R13 R14 R15 R16 R17 R18 R19 R20, C3. C4. C5. C6 D3 D6 D7. D8 Q3 Q6 ADDED 26.9.80
7 ECO 1199 R10 WAS 12.K JK 24.2.81

DRAWN B.J	APPROVED	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL ——	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
DATE 9-3-79	DATE	SCALE NOT TO BE SCALED		FINISH ——	TITLE REAR INPUT / RATIO CIRCUIT.	DRAWING No. 430307 SHEET 1 OF 1

DRAWING No. 400308

FIRST USED ON 1061 - 1071

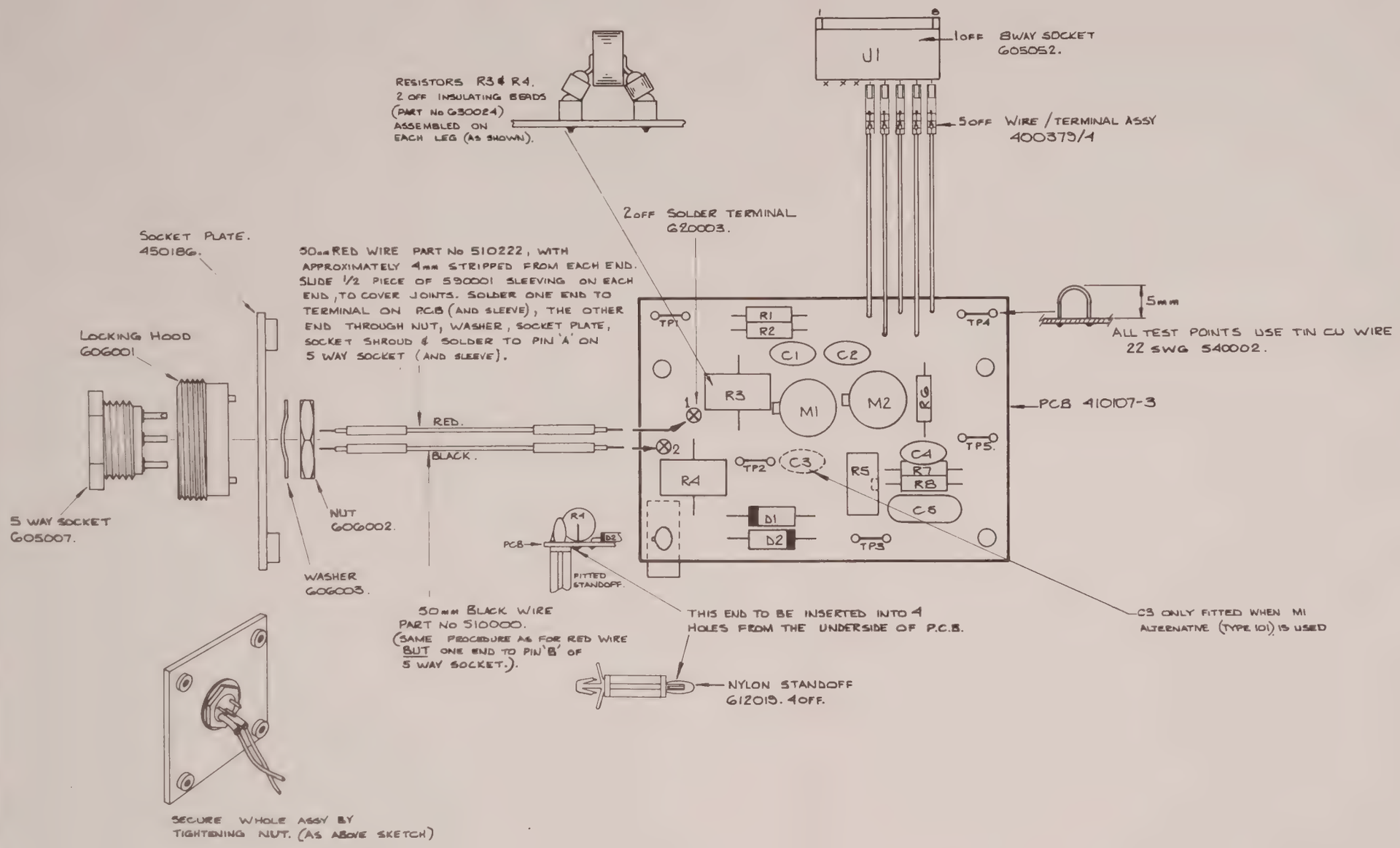
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
1	RELEASED. 27-DEC-78. W.O.S.
2	POSITION OF TAG ON M1 & M2 CORRECTED. D2 POSITION REVERSED. ECO. 907 20.6.79 IL.
3	PARTS LIST CHANGE TO R7 ECO. 945 10.9.79 IL.


RESISTORS R3 & R4. 2 OFF INSULATING BEADS (PART No G30024) ASSEMBLED ON EACH LEG (AS SHOWN).
J1
1 OFF 8WAY SOCKET G05052.
5 OFF WIRE / TERMINAL ASSY 400379/1
2 OFF SOLDER TERMINAL G20003.
SOCKET PLATE. 45018G.
50mm RED WIRE PART No 510222, WITH APPROXIMATELY 4mm STRIPPED FROM EACH END. SLIDE 1/2 PIECE OF 590001 SLEEVING ON EACH END, TO COVER JOINTS. SOLDER ONE END TO TERMINAL ON PCB (AND SLEEVE), THE OTHER END THROUGH NUT, WASHER, SOCKET PLATE, SOCKET SHROUD & SOLDER TO PIN 'A' ON 5 WAY SOCKET (AND SLEEVE).
5mm
ALL TEST POINTS USE TIN CU WIRE 22 SWG 540002.
LOCKING HOOD G06001
RED.
BLACK.
PCB 410107-3
5 WAY SOCKET G05007.
NUT G06002.
WASHER G06003.
50mm BLACK WIRE PART No 510000. (SAME PROCEDURE AS FOR RED WIRE BUT ONE END TO PIN 'B' OF 5 WAY SOCKET.).
PCB
FITTED STANDOFF.
THIS END TO BE INSERTED INTO 4 HOLES FROM THE UNDERSIDE OF P.C.B.
C3 ONLY FITTED WHEN M1 ALTERNATIVE (TYPE 101) IS USED
NYLON STANDOFF G12019. 4 OFF.
SECURE WHOLE ASSY BY TIGHTENING NUT. (AS ABOVE SKETCH)

DRAWN B.J.	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ½° INCH DIMENSIONS: DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64. METRIC DIMENSIONS: DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm. UNLESS OTHERWISE STATED	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A2
TRACED	APPROVED	SCALE 2:1 NOT TO BE SCALED		FINISH	TITLE ANALOGUE OUTPUT PCB ASSY	DRAWING No. 400308 SHEET 1 of 4
DATE 27-11-78	DATE					

DRAWING No.	FIRST USED ON
430308	1061 - 1071

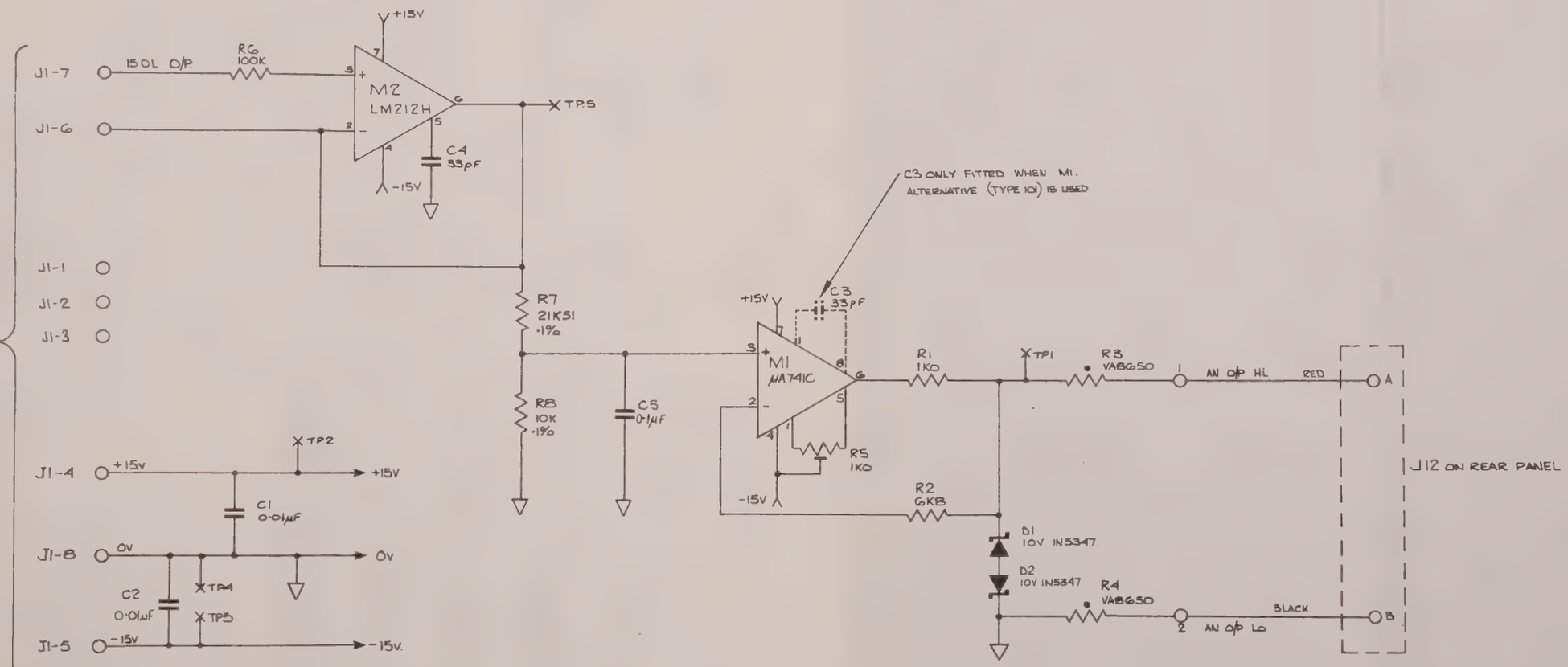
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
1	RELEASED 27-DEC-78 W.O.9.
2	R7 WAS 21K78 ECO. 945 10.9.79 B.J



DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES	MATERIAL
B.J.		MILLIMETRES	ANGULAR ± ½°	
TRACED	APPROVED	SCALE	INCH DIMENSIONS: DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64	FINISH
DATE 29-11-78	DATE	NOT TO BE SCALED	METRIC DIMENSIONS: DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm	
			UNLESS OTHERWISE STATED	

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A2

TITLE: ANALOGUE OUTPUT CIRCUIT.

DRAWING No. 430308

SHEET 1 OF 1

DRAWING No: 400328
FIRST USED ON: 1061

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1. SOLDER PCB TERMINAL LUG PART Nº G20005 4 OFF SHOWN AS ⊗
2. FIX RELAY BRACKET 498112 TO PCB WITH SCREW M3 X 6mm POZI-PAN G11004. 1 OFF. SHAKE PROOF WASHER G13005. 1 OFF NUT M3 FULL HEX STEEL G15002. 1 OFF.
3. DIODES D1, D3, D5, D9-11, D16, D17, D20, D25 – D30, D36 – D39, D53, D54 & D66 – D68 TO BE SLEEVED WITH BLACK SLEEVING – 590055. 10mm PER DIODE.

ALL SINGLE FET LEGS IN THE ORDER SHOWN

ALL TRANSISTOR LEGS IN THE ORDER SHOWN.

THE LEADS OF C60 & R227 MUST BE KEPT SHORT AS POSSIBLE & A MECHANICAL JOINT TO BE MADE.

MOUNT ALL OTHER I.C.'S ON 16 WAY DIL SOCKETS 605061 12 OFF

WIRE 7/2 PTFE INSULATED WHITE 540008

MOUNT M12, M16, M17, M18, M19, M26, M27, M29 ON 14 WAY DIL SOCKETS 605060 8 OFF

NOTE ALL TEST LINKS TO BE AS TEST POINTS.

WIRE/TERMINAL ASSY 400379/1 7 OFF.

4 OFF RED SOCKET CLIPS PART No 606005

CUT TRACK COMP SIDE OF PCB MAKING A GAP OF 1.50mm

ALL LINKS AND TEST POINTS USE TINNED COPPER WIRE PART No 540004

6 OFF CERAMIC BEADS PART No 630036

SLEEVE LEADS OF D68 BEFORE SOLDERING TO UNDERSIDE OF PCB. USE 590004.

NOTE :- FIT E906 AS SHOWN ON DIAG. FIT TCR506 AS SHOWN WITH FLAT ON THE LEFT.

TCR506

* NYLATCH - GROMMET 617011 8 OFF

* NYLATCH - PLUNGER 617010 8 OFF

NB. FIT FROM COMPONENT SIDE OF PCB

SECTION A-A

FSV TERMINAL PART No 602001 6 OFF

COLOUR DOTS TO BE ON TOP

3mm APPROX

PCB 410095-5A

LOOP D39 & D60 LEADS AS ABOVE

MOUNT M39, Q35, Q36 ON 8 WAY DIL SOCKET No 605059 - 3 OFF

ENSURE THAT ALL RESISTORS MARKED * ARE MOUNTED 3mm OFF PCB

10 OFF UNSLEEVED LINKS

CLOVERLEAF TERMINALS PART No 620005 10 OFF

NOTE ! ALL RELAY WIRES USE 7/2 PTFE INSULATED WHITE 540008 STRIP 5mm FROM EACH END

TO SOLDER TERMINAL A WIRE LENGTH 30 mm

TO STANDOFF PIN AT B WIRE LENGTH 35 mm

TO STANDOFF PIN AT C. WIRE LENGTH 35 mm

TO SOLDER TERMINAL E WIRE LENGTH 40 mm

WIRE 25 mm LONG JOINING THESE TERMINALS TOGETHER SLEEVED (AS SHOWN)

VIEW IN DIRECTION OF ARROW

SLEEVE ALL JOINTS WITH ½" PIECE OF 590001

1 OFF NUT G15005

1 OFF WASHER M25 INT SHAKEPROOF G13014

JOIN J1 BOTTOM TERMINAL OF RELAY INTO HOLE IN PCB WITH TINNED COPPER WIRE.

WIRE/TERMINAL ASSY 400379/2 4 OFF

8 WAY POLARISED SOCKET 605052 - 2 OFF

ISS.	CHANGES
A	
B	UPDATED PCB.
1	RELEASED TO PRODN 23-11-78
2	R48 WAS 10K (2000078) ROARED 8K2 WAS 8K06 (2000271) M17 WAS 1406 (2800026) ECO 807 26-FEB-79 W.B.S.
3	COMPONENT VALUES CHANGED. REFER TO ECO 826 & ECO 834 4-4-79 IL
4	COMPONENT VALUES CHANGED. REFER TO ECO 853 23-4-79 B.J.
5	D57 REMOVED & PTS. LT CHANGE TO R24 ECO 886/890/904 IL 19.6.79
6	ECO 925 D40 WAS BEEN RE-NOTATED B.J. 16-7-79
7	ECO 937 PCB. R49 & To 15K 5% IL 4.9.79
8	ECO 959 C59 ADDED ACROSS M16-12 & M16-11 IL 20.9.79
9	ECO 963, 972 & 984. C30 REMOVED. CHANGED R182, R188, C31, C35, M36 & RL1 BJ 12-10-79
10	ECO 987, 989 & 997 RELAY WIRES WERE PVC. INSULATED R57 WAS 47R, R127 WAS 10M (P41006) R219, 220, 221 & 222 WERE 1M, C215 R227 & C60 ADDED B.J 30-10-79
11	ECO 1000 SOCKET CLIP 606005 WAS 606007 IL 18.1.80
12	ECO 1045 1072 1077 PARTS LIST CHANGES IL 27.2.80
13	ECO 1098, 1107 CLOVERLEAPS WERE 18 OFF D58 REMOVED & REPLACED BY LK3 R217, C59 & LINKS F, 4 'G' DELETED. PARTS LIST CHANGES IL 16.4.80
14	ECO 1050, 1117, 1128 PARTS LIST CHANGES CB RELOCATED. D68 ADDED. R41/R88 DELETED. IL 2.6.80
15	ECO 1168, 1144 Q35 Q36 WERE 2N3856 R18, R35, R36 Q2 & Q3 ADDED IL 24.9.80
16	ECO 1114, 1152, 1184, 1188, 1190, 1191, 1193, 1192. Q35 & Q36 NOW MOUNT ON DIL SOCKET 60 8 OFF. R236 & R237 ADDED. WIRE TERMINAL 'E' TO J1-7 WAS FITTED TO J1-8 TRACK FROM WHERE J1-7 WIRE JOINS PCB CUT ON COMP SIDE. LK21 ADDED. FURTHER PARTS LIST CHANGES IL 15.12.80

DRAWN	CHECKED
BJ	
TRACED	APPROVED
DATE 12.7.78	DATE

DIMENSIONS IN MILLIMETRES

SCALE 2:1 NOT TO BE SCALED

TOLERANCES: INCH DIMENSIONS — DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; ANGULAR ± °. METRIC DIMENSIONS — DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm. UNLESS OTHERWISE STATED

MATERIAL

FINISH

datron ELECTRONICS LTD. NORWICH.

TITLE: 1061 ANALOGUE PCB ASSEMBLY

DRAWING No. 400328

DRAWING SIZE A1

SHEET 1 OF 2

DRAWING No 430328

FIRST USED ON 1061

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

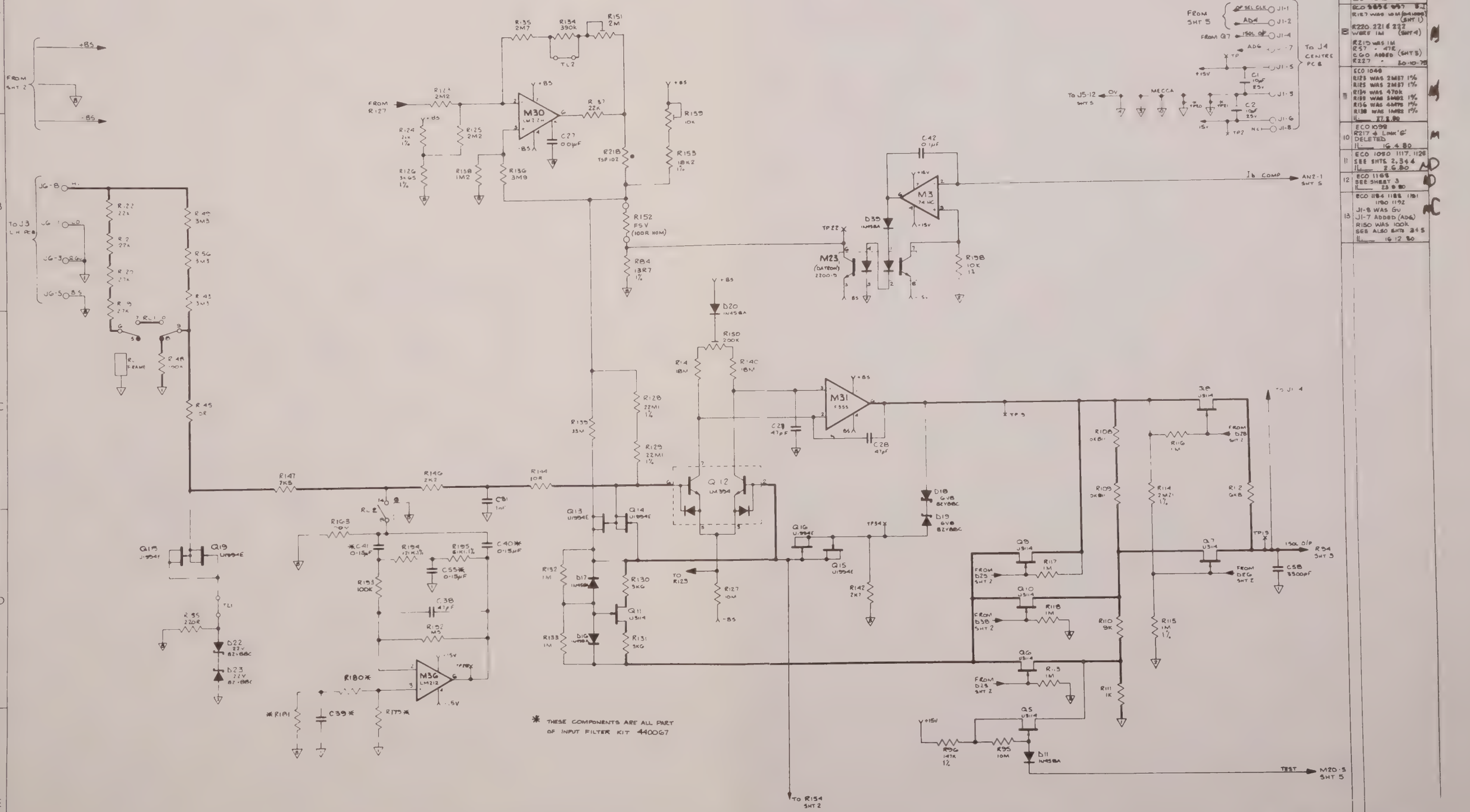
ALL BURRS TO BE REMOVED

NOTES

▽ = SIGNAL COMMONS

▽ = ANALOGUE COMMON

ISS.	CHANGES
3	RE DRAWN 13.4.79 ECO 862, 884 & 885 ECO 885
4	SEE SHEETS 2 & 3
5	SEE SHEET 5
6	ECO 930 SEE SHT. 5 IL 20.8.79
7	ECO 965 M36 WAS LM324 ECO 986 C30 DELETED EJ 12-10-79.
8	ECO 1052 1057 R27 R127 WAS 10M (SHT 1) R220, 221 & 222 WERE 1M (SHT 4) R215 WAS 1M R57 - 47R C60 ADDED (SHT 5) R227 " 30-10-79
9	ECO 1048 R123 WAS 2M87 1% R125 WAS 2M87 1% R134 WAS 470K R139 WAS 3M92 1% R136 WAS 649K 1% R138 WAS 1M82 1% IL 27.2.80
10	ECO 1098 R217 & LINK 'G' DELETED IL 16.4.80
11	ECO 1050 1117, 1126 SEE SHTS 2, 3 & 4 IL 2.6.80
12	ECO 1165 SEE SHEET 3 IL 23.9.80
13	ECO 1184 1188, 1191 1180 1192 J1-8 WAS GU J1-7 ADDED (ADG) R150 WAS 100K SEE ALSO SHTS 3 & 5 IL 16.12.80



DRAWN BJ	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL ——	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A1
TRACED	APPROVED	SCALE NOT TO BE SCALED		FINISH ——	TITLE DC ISOLATOR 1061	DRAWING No 430328 SHEET 1 OF 5
DATE 5-4-79	DATE					

DRAWING No. 430328

FIRST USED ON 1081

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

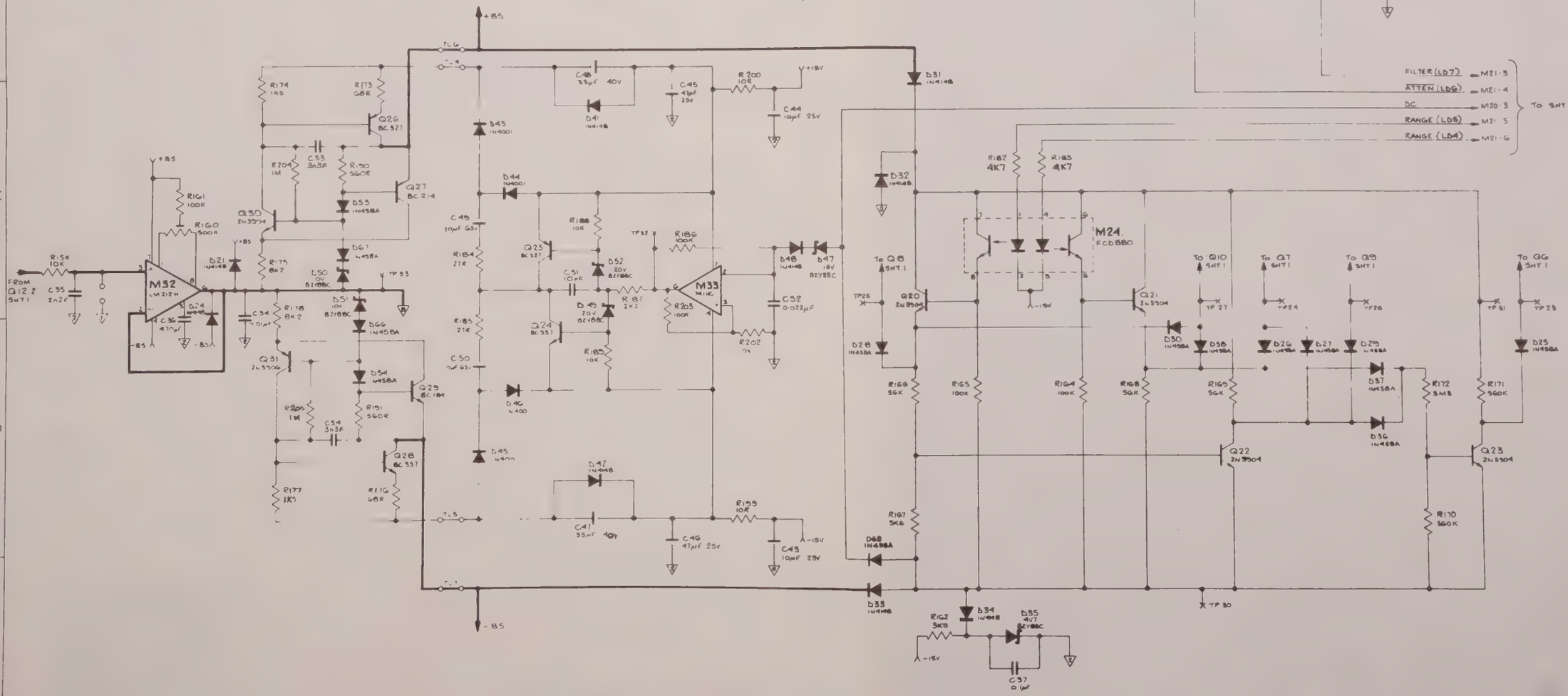
RANGE	FET CONTROL LINE TP 23	TP 24	TP 25	TP 26	TP 27
100 mV	1	0	1	0	0
1 V	0	0	1	0	1
0 V	0	1	0	1	0
00 V	0	0	1	0	1
1000 V	0	1	0	1	0
DC	0	0	1	1	0

LOGIC 1 = FET ON
0 = FET OFF

RANGE	INPUT CONTROL LINE LD7	LD6	LD5	LD4
100 mV	X	1	1	0
1 V	X	1	1	1
10 V	X	1	0	1
100 V	X	0	1	1
1000 V	X	0	0	1
DC	1	0	0	0
FILTER	0	X	1	X

LOGIC 1 = 0V
0 = -15V

ISS.	CHANGES	
3	RE-DRAWN 19-4-79 ECO 826, 834 & 835 B.J	NO
4	D57 DELETED IL ECO 886 20.6.79	NO
5	SEE SHEET 5.	NO
6	SEE SHEET 5	NO
7	ECO 363 R182 & 183 WERE 10K B.J 12-10-79	NO
8	ECO 985 & 997 B.J SEE SHEET 1. 30-10-79	NO
9	ECO 1072 C51 WAS 2n2F C53 C54 WERE 10nF IL 27.2.80	NO
10	SEE SHEETS 1, 3 & 5 IL 16.4.80	NO
11	ECO 1117 D58 ADDED IL 2.6.80	NO
12	SEE SHEET 3	NO
13	SEE SHEETS 1, 3 & 4	NO



DRAWN B J	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm; UNLESS OTHERWISE STATED; ANGULAR ± °	MATERIAL ——	datron ELECTRONICS LTD. NORWICH.
TRACED	APPROVED	SCALE NOT TO BE SCALED		FINISH ——	TITLE BOOT STRAPPED SUPPLIES & RANGE LOGIC 1081
DATE 17-4-79	DATE				DRAWING No. 430328

DRAWING SIZE A1

SHEET 2 OF 5

DRAWING No 430328

FIRST USED ON 1061

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

SS	CHANGES
3	RE DRAWN 19-4-79 ECO 870, 894 & 895 ECO 855
4	R24 WAS 820K ECO 910 20 6 79
5	SEE SHEET 5
6	SEE SHEET 5
7	SEE SHEET 1 & 2
8	ECO 885 & 997 BJ SEE SHT 1 30-10-79
9	SEE SHEETS 1 & 2
10	ECO 1088 Q35 Q36 WERE SU2656M R4G WAS 1K5 DSB DELETED & REPLACED WITH LK3 16 4 80
11	ECO 1050 R58 WAS 1k C8 WAS ACROSS R24 C11 WAS 1nF C57 WAS 68PF M22 WAS LF355H 2.6.80
12	Q35 & Q36 WERE 2N3956 R4 WAS 10M R5 WAS 18k R12 & R14 WERE 5K6 R13 & R35 WERE ADDED R36 R24 WAS 680k C12 WAS 0·47µF Q24 Q8 ADDED LK1 & LK2 REMOVED 25 9 80
13	R236 & R237 ADDED R57 WAS 200R 16 12 80

CONDITION	MULTIPLEXER a	b	c	RESET
RESET	1	1	1	1
SIG	1	1	0	0
-Ve BIAS	0	1	0	0
+Ve REF 1	1	0	0	0
+Ve REF 2	0	0	0	0
+Ve BIAS	0	1	1	0
-Ve REF 1	1	0	1	0
-Ve REF 2	0	0	1	0

DRAWN B J	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL	datron ELECTRONICS LTD. NORWICH.
TRACED	APPROVED	SCALE NOT TO BE SCALED		FINISH	TITLE A-D CONVERTOR. 10BIT
DATE 11-4-79	DATE				DRAW

DRAWING No. 430328

FIRST USED ON 1061

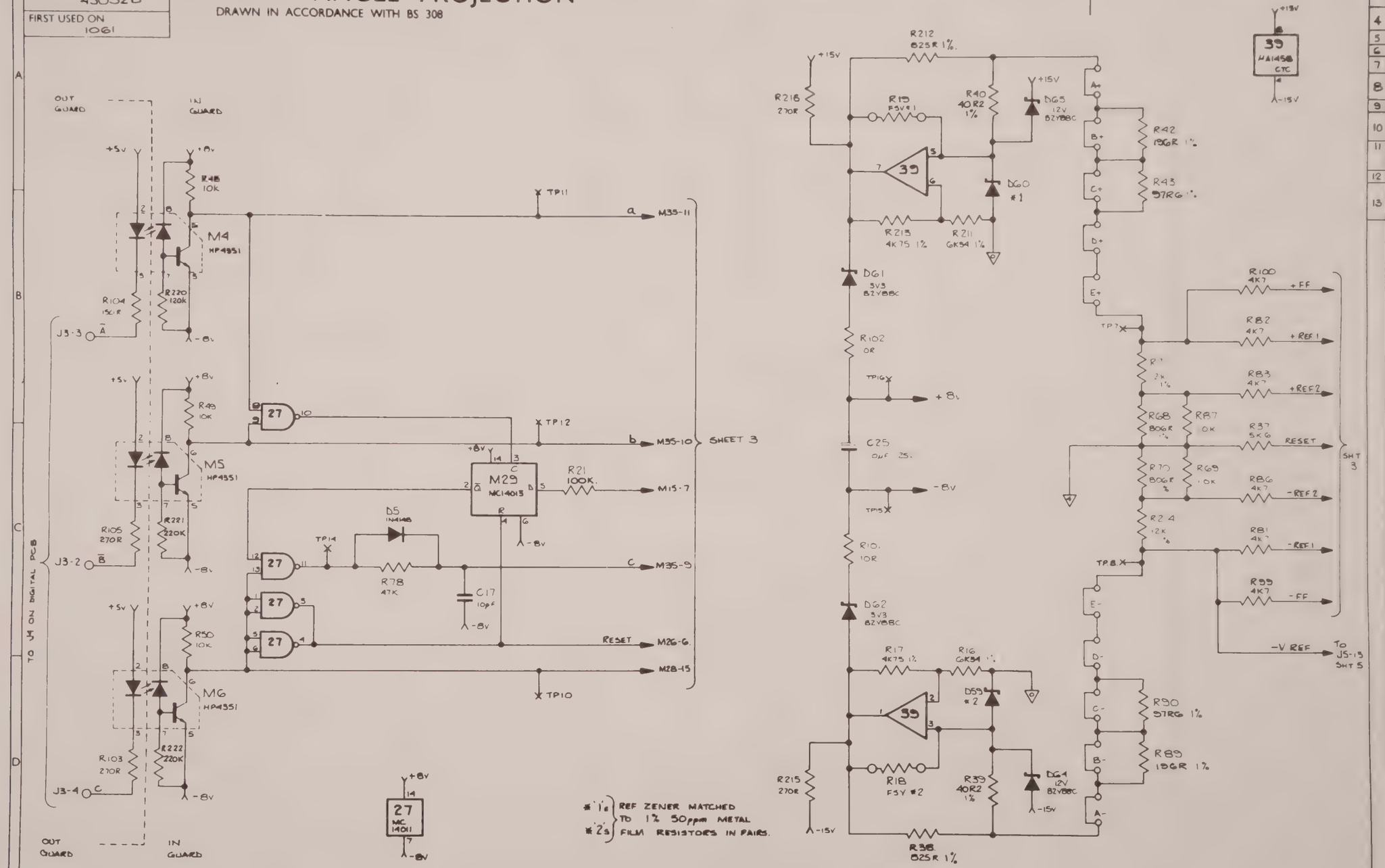
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS	CHANGES
3	RE-DRAWN B.J. 19-4-79 ECO 826 834 & ECO 853
4	SEE SHEETS 2 & 3.
5	SEE SHEET 5.
6	SEE SHEET 5
7	SEE SHEET 1 & 2
8	ECO 985 & 987. SEE SHT 1. B.J. 30-10-79
9	SEE SHEETS 1 & 2
10	SEE SHEETS 1 3 4 5 IL. 16.4.80
11	ECO 1128 R41 & R88 DELETED IL. 8.6.80
12	SEE SHEET 3
13	R48 WAS 5K6 R105 WAS 150R R220 WAS 220K IL. 16.12.80



DRAWN B.J.	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ½° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ∓ 4mm; UNLESS OTHERWISE STATED	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A2
TRACED	APPROVED	SCALE NOT TO BE SCALED		FINISH	TITLE A-D CONTROL & REFERENCES. 1061	DRAWING No. 430328
DATE 6-4-79.	DATE					SHEET 4 OF 5

DRAWING No.	
430328	
FIRST USED ON	
1061	

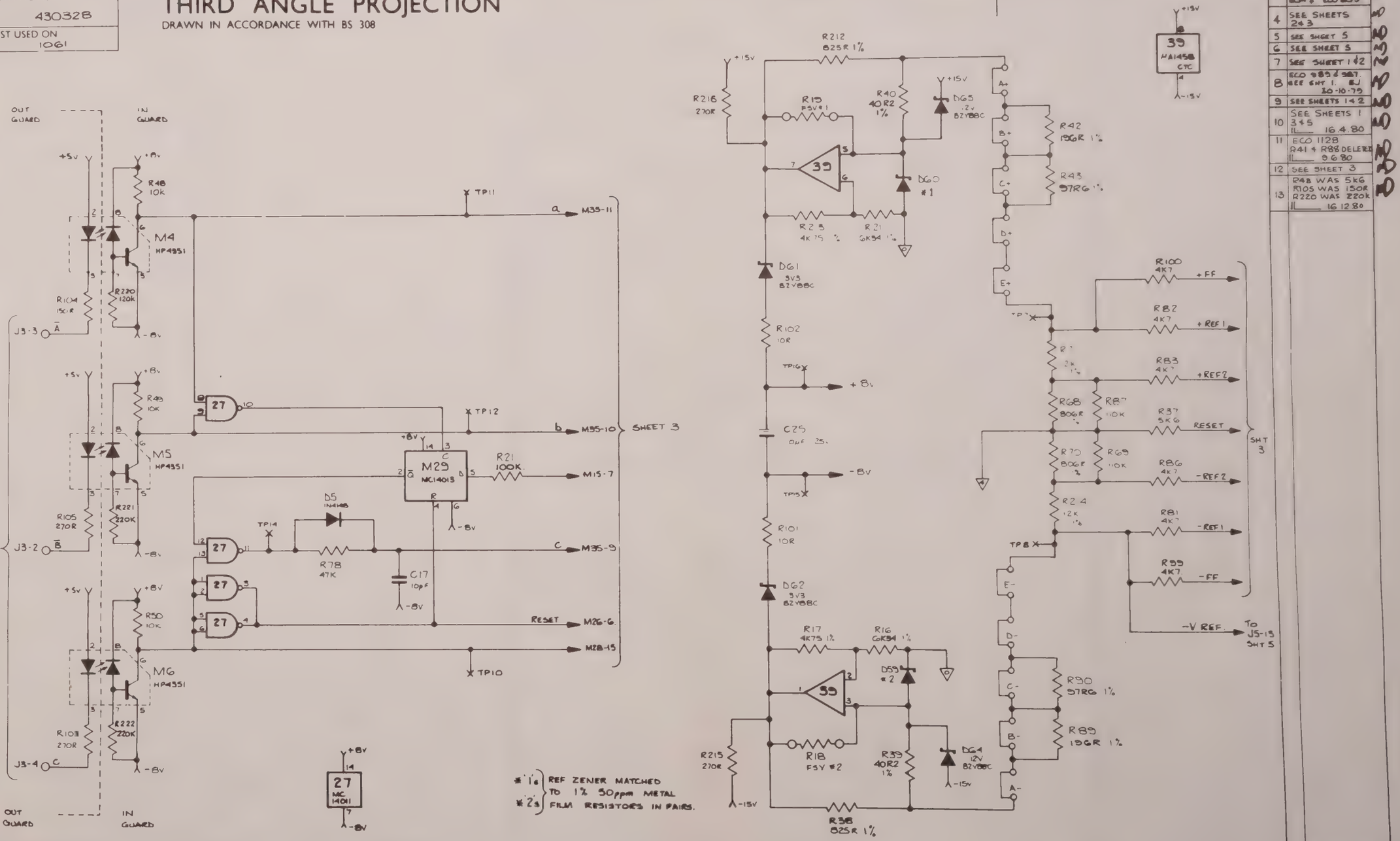
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS	CHANGES
3	RE-DRAWN B.J 15-4-79 ECO 820 834 & ECO 853
4	SEE SHEETS 2 & 3
5	SEE SHEET 5
6	SEE SHEET 5
7	SEE SHEET 1 & 2
8	ECO 853 & SHT. REF SHT 1. BJ 30-10-79
9	SEE SHEETS 1 & 2
10	SEE SHEETS 1 3 & 5 IL 16.4.80
11	ECO 1128 R41 & R88 DELETED IL 9.6.80
12	SEE SHEET 3
13	R48 WAS 5K6 R105 WAS 150R R220 WAS 220k IL 16.12.80



DRAWN	CHECKED	DIMENSIONS IN	TOLERANCES ANGULAR ± ½°	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE
B J		MILLIMETRES	INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64; METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm; UNLESS OTHERWISE STATED			A2
TRACED	APPROVED	SCALE		FINISH	TITLE	DRAWING No. / SHEET
DATE 6-4-79	DATE	NOT TO BE SCALED			A-D CONTROL & REFERENCES. 1061	430328 / 4 OF 5

DRAWING No 430328
USED ON 1061

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS	CHANGES
3	RE-DRAWN 19-4-79 ECO 826 BJ
4	SEE SHEETS 2 & 3
5	ECO 929 D40 WAS BYEN RE-INSTATED BJ 16-7-79
6	ECO 949 C28 ADDED ACROSS M16-8 & M18-8 IL 20.9.79
7	SEE SHEET 1 & 2
8	ECO 985 & 987 BJ SEE SHEET 1 10-10-79
9	SEE SHEETS 1 & 2
10	ECO 1088 : 1107 LINK 'F' DELETED M16 WAS 14069 C39 DELETED C26 WAS 1nF R83 WAS 100K R106/R107 WERE 3k3 IL 17.4.80
11	SEE SHEETS 2 & 3
12	SEE SHEET 3
13	SEE SHEETS 1, 3 & 4

OUT OF GUARD | IN GUARD

J3-1 +5V
J3-16 ID7
J3-15 ID6
J3-14 ID5
J3-13 ID4
J3-12 ID3
J3-11 ID2
J3-10 ID1
J3-9 ID Ø
J3-6 COND VAL
J3-7 IA1
J3-8 IA Ø

TO J4 DIGITAL PCB

M8-A, M8-B, M9-A, M9-B, M10-A, M10-B, M11-A, M11-B, M2-B, M7-B, M7-A, M2-A

AN1 5K8, AN1 3K3, AN1 5K3, R156 5K3, R72 4K7, R107 2K2, R106 2K2

D13 IN4148, D12 IN4148, D15 IN4148, D14 IN4148

R52 330K, R53 330K, R54 330K, R55 330K

AD7, AD6, AD5, AD4, AD3, AD2, AD1, AD0

OP SEL CLK, H.F.FLAG, LD CLK

M20 14076 — C33 0.1µF, R157 10K

M21 14076 — R201 820K, D40 IN4148, C32 0.0 µF

M13 14076

M14 14076 — DG3 IN4148, R95 120K, C26 470pF

TEST → TO D11 SHT 1
AVE → TO D8 SHT 3
DC → TO D47
LD4 → TO R183
LD5 → TO R182
LD6 → TO R203
LD7 → TO R206
→ TO SHT 2

AN2: 200R, 100K, 200K

Ib COMP → TO M3-2 SHT 1

TL3

J5-1 A D0
J5-2 A D1
J5-3 A D2
J5-4 A D3
J5-5 A D4
J5-6 A D5
J5-7 A D6
J5-8 A D7
J5-9 OP SEL CLK
J5-10 LD CLK
J5-11
J5-12 R REF COM
J5-13 -V REF
J5-14 0V
J5-15 +15V
J5-16 5V

TO J2 OHMS PCB

TO TPB SHT 4
TO J1-3 SHT 1

J2-1 AD0
J2-2 AD1
J2-3 AD2
J2-4 AD3
J2-5 AD4
J2-6 AD5
J2-7 AD6
J2-8 AD7
J2-9 OP SEL CLK
J2-10 LD CLK
J2-11
J2-12
J2-13
J2-14 0V
J2-15 +15V
J2-16 -15V

TO J1 CURRENT PCB

J4-1 H.F. FLAG
J4-2 AD1
J4-3 AD2
J4-4 AD3
J4-5 AD4
J4-6 AD5
J4-7 AD6
J4-8 AD7
J4-9 OP SEL CLK
J4-10 LD CLK
J4-11 H.F. COMP
J4-12 O/P COM
J4-13 SDL O/P
J4-14 0V
J4-15 +15V
J4-16 -15V

TO J1 AC PCB

DRAWN BJ	CHECKED DLV	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL —	datron ELECTRONICS LTD. NORWICH.
TRACED	APPROVED	SCALE NOT TO BE SCALED		FINISH —	TITLE ANALOGUE INTERFACE LOGIC 1061
DATE 18-4-79	DATE				DRAWING No 430328

DRAWING SIZE A1

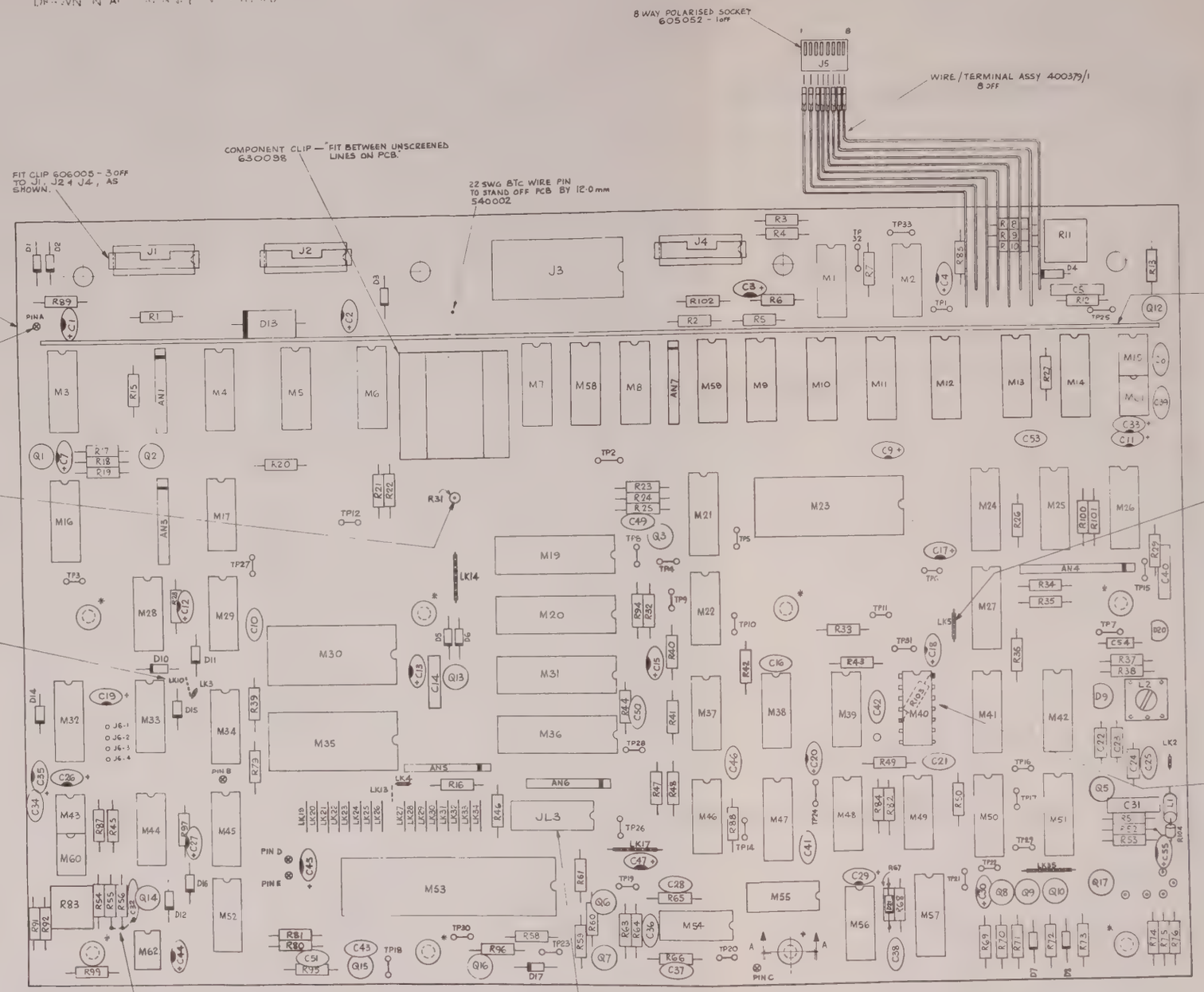
SHEET 5 OF 5

DRAWING No. 400329

FIRST USED IN 1061

THIRD ANGLE PROJECTION

DRAWN IN AUGUST '78


8 WAY POLARISED SOCKET 605052 - 1 off
J5
WIRE/TERMINAL ASSY 400379/1 8 off
COMPONENT CLIP — FIT BETWEEN UNSCREENED LINES ON PCB.
FIT CLIP 606005 - 3 off TO J1, J2 & J4, AS SHOWN.
22 SWG BTC WIRE PIN TO STAND OFF PCB BY 12·0mm 540002
PC BOARD 410096-7A
5 off SOLDER TERMINAL 620003 PINS MARKED A, B, C etc.
BUS STRIP 920048
RB1 TO BE MOUNTED ON END 1mm. ABOVE PCB.
N.B. FREE END OF R31 WILL BE SOLDERED TO BATTERY B1 AT CHASSIS ASSY STAGE.
WHEN FITTING 8K ROM, (M30/M35) REMOVE LK3 AND LK4. FIT LK10 AND LK13
N.B. FOR 400Hz OPERATION, LK7 TO BE FITTED AND LK5 50Hz OPERATION TO BE REMOVED
FIT R103 UNDERSIDE OF PCB BETWEEN M40/5 & M40/14
NYLATCH - PLUNGER 617010 - 8 off N.B FIT FROM COMPONENT SIDE OF PCB.
NYLATCH - GROMMET 617011 - 8 off
SECTION A-A (TYPICAL)
LEAVE LONG AND SOLDER LEAD OF C52 TO R55 AND R56. MAKE CONNECTION ON UNDERSIDE OF PCB.
Mount JL3 on 16 way D.I.L. Socket 605038

NOTES

1. MAKE TP1 - TP29 FROM 22 SWG BTC WIRE — PART No 540002
2. LINKS (LK) MADE FROM 22 SWG BTC WIRE (540002) AND SLEEVED (EXCEPT FOR LK18 — LK34.) 590004
3. MOUNT M1, 2, 7, 11, 22, 28, 29, 33, 34, 37–40, 44–46, 48, 49, 52, 54, 55, 56 ON 14 WAY DIL SOCKETS. PART No 605060 — 21 off
4. MOUNT M3–14, 16, 21, 24–27, 32, 41, 42, 43, 60, 47, 50, 53, 59, 57, 58, 61 ON 16 WAY D.I.L. SOCKETS PART No 605061 — 29 off
5. MOUNT M30 & 35 ON 24 WAY D.I.L. SOCKETS PART No 605064
6. MOUNT M19, 20, 31, 36 ON 22 WAY D.I.L. SOCKETS PART No 605063.
7. MOUNT M23 ON 28 WAY D.I.L. SOCKET PART No 605065
8. MOUNT M53 ON 40 WAY D.I.L. SOCKET PART No 605050
9. MOUNT M67 ON 8 WAY D.I.L. SOCKET PART No 605059
10. DIODE D5 TO BE SLEEVED WITH BLACK SLEEVING 590053. 10mm LENGTH.

CHANGES

A		
1	RELEASED TO PROD'N 24.11.78	
2	ECO 811 4.1.79 ISS 4 PCB UPDATE IL	
3	ECO 845 CAB COMP (0510) ADDED C25 MMB 100K (150C60) C24 MMB 100K (150C60) C25 MMB 47nF (150C61) 25.1.79 IL	MD
4	ECO 835/852 ISS 5 PCB UPDATE - SEE ECO's FOR FULL DETAILS IL 17.4.79	MD
5	ECOs 863/872/904 /905/911/912 PARTS LIST CHANGES IL 19.6.79	MD
6	ECO 928 C53 ADDED PTS LT CHANGE to RB5 IL 17.7.79	MD
7	ECO 941/948 PTS LT CHANGE to R2 IL 4.9.79	MD
8	ECO 939 941 989 1004 PTS LT CHANGE IL 29.10.79	MD
9	ECOs 998 1006 1082 1085 1087 ISS 6 PCB UPDATE SEE ECO's FOR FULL DETAILS IL 4.1.80	MD
10	ECO 1057 PARTS LIST CHANGE ONLY IL 23.1.80	MD
11	ECO 1067 WIRE TERMINAL ASSY 400379 ADDED AS 2 3-488 BC	MD
12	ECO 1046 1086 1091 1092 PCB UPDATED ISS 7A PARTS LIST CHANGES IL 20.3.80	MD
13	ECO 1108 R103 ADDED PARTS LIST CHANGES IL 18.4.80	MD
14	ECO 1135 R104 ADDED + PARTS LIST CHANGES IL 18.6.80	MD
15	ECO 1137-1140-1142 PARTS LIST CHANGES C82 CONNECTED TO R55 R56 + SIGN ADDED TO TANT CAPS IL 28.7.80	MD
16	ECO 1147 D21 ADDED IL 30.9.80	MD
17	ECO 1188 R23 WAS 1K - PARTS LIST CHANGE IL 6.1.81	MD

IL P.R.H.

ANGULAR ± °

MATERIAL

FINISH

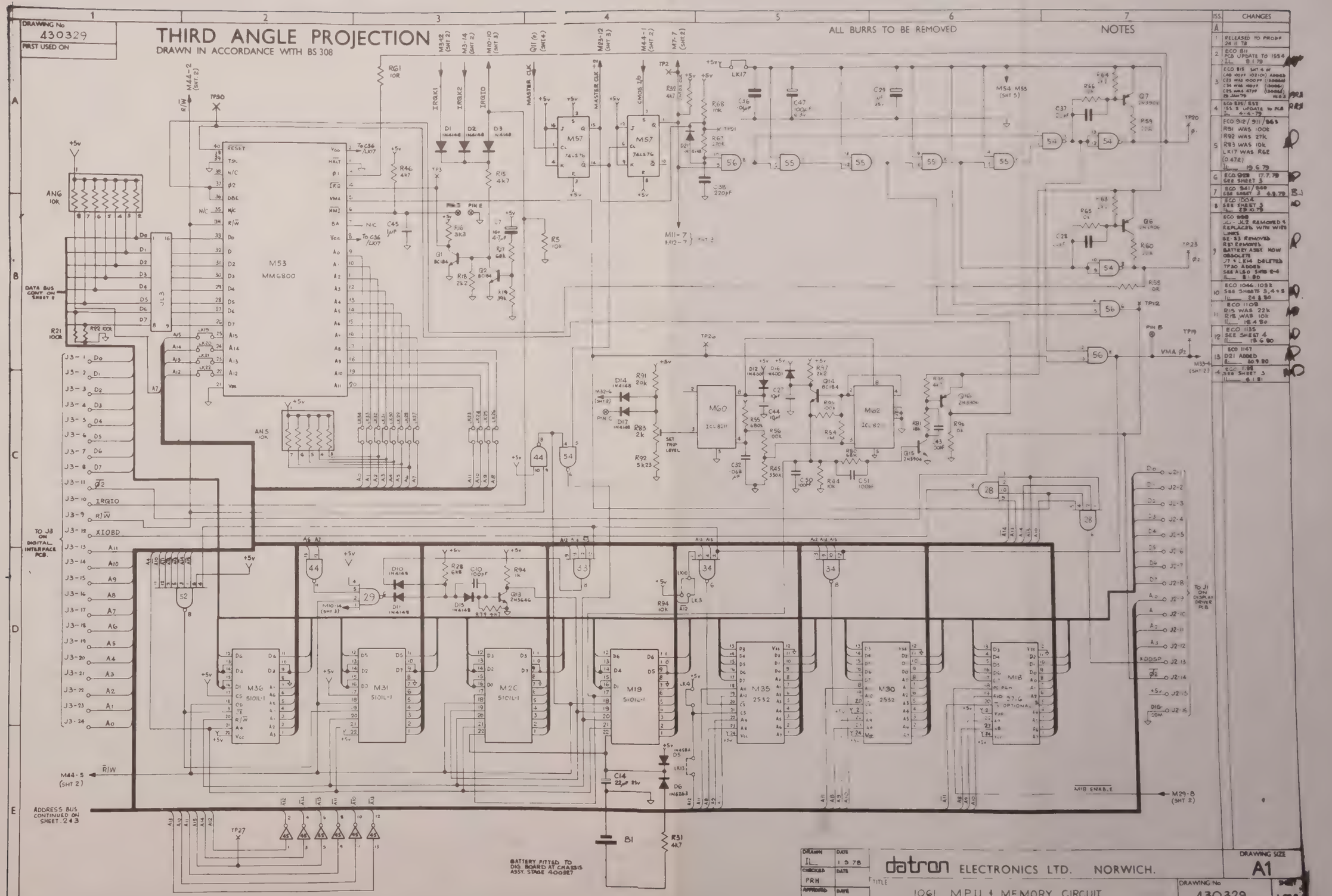
datron ELECTRONICS LTD. NORWICH.

TITLE 1061 DIGITAL PCB. ASSY.

DRAWING No. 400329

SHEET 1 OF 15

DRAWING SIZE A1


DRAWING No 430329
FIRST USED ON
THIRD ANGLE PROJECTION
DRAWN IN ACCORDANCE WITH BS 308
ALL BURRS TO BE REMOVED
NOTES
ISS. CHANGES
M53 MMG800
M57 74LS76
M60 ICL8211
M62 ICL8211
M36 5101L-1
M31 5101L-1
M2C 5101L-1
M19 5101L-1
M35 2532
M30 2532
M18 PS PROM
ANG 10K
ANS 10K
DATA BUS CONT ON SHEET 8
TO J3 ON DIGITAL INTERFACE PCB.
TO J1 ON DISPLAY DRIVER PCB
ADDRESS BUS CONTINUED ON SHEET 243
BATTERY FITTED TO DIG. BOARD AT CHASSIS ASSY. STAGE 400827
M18 ENABLE
datron ELECTRONICS LTD. NORWICH.
DRAWN IL DATE 1 9 78
CHECKED PRH DATE
APPROVED DATE
TITLE 1061 MPU & MEMORY CIRCUIT
DRAWING SIZE A1
DRAWING No 430329
SHEET 1 OF 8

DRAWING No. 430329

FIRST USED ON

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
A	
1	RELEASED TO PRODN 24-11-78
2	ECO 811 PCB UPDATE TO 1864 IL 8-1-79
3	ECO 845 C48 COM (0.01µF) ADDED C23 and 100M (150ohm) C24 and COM (150ohm) C25 and 47M (150ohm) 29 JAN 79 IL
4	183 & UPDATE TO PCB ECO 935/883 6-6-79 IL
5	SEE SHEETS 1 & 3
6	SEE SHEET 3
7	SEE SHEET 3
8	SEE SHEET 3
9	ECO 998 SI 4 LK18 - LK16 DELETED ANT. R102 ADDED IL 8-1-80
10	SEE SHEETS 3, 4 & 5 IL 29-2-80
11	SEE SHEETS 1, 3 & 5 IL 18-4-80
12	SEE SHEET 4
13	SEE SHEET 3

M57-11 (SHT 1) CMOS CLK

M10-12 (SHT. 3) TIME GUARD

M43 555

R87 100k

C34 ·01µF

C35 10µF

R39 10K

M16 74LS155

M32 74LS155

R20 100K

R1 10k

AN1 10k

AN3 10k

AN8 10k

AN7 10K

R102 10k

M7 14076

M8 14076

M9 14076

R23 M10-2

M21-2,15

M21-4,12

M21-6,10

TO J3 ANALOGUE PCB

XKDSP3 J1-16

XKYBRD J1-15

CMOS CLK J1-14

XKDSP1 J1-13

XKDSP2 J1-12

XKDSP0 J1-11

IRQK2 J1-10

IRQK1 J1-9

CD7 J1-8

CD6 J1-7

CD5 J1-6

CD4 J1-5

CD0 J1-4

CD1 J1-3

CD2 J1-2

CD3 J1-1

TO J2 CENTRE PCB

To DI4 (SHT. 1)

VMA Ø2 M56-11 (SHT 1)

ADDRESS BUS CONTINUED ON SHEET 1 & 3

CMOS DATA BUS CONTINUED ON SHEET 3

XADSTA M10-1 15 (SHT 3)

R89 10k

R3 10k

R4 10k

J5-5 J5-4 TO J3 CENTRE PCB

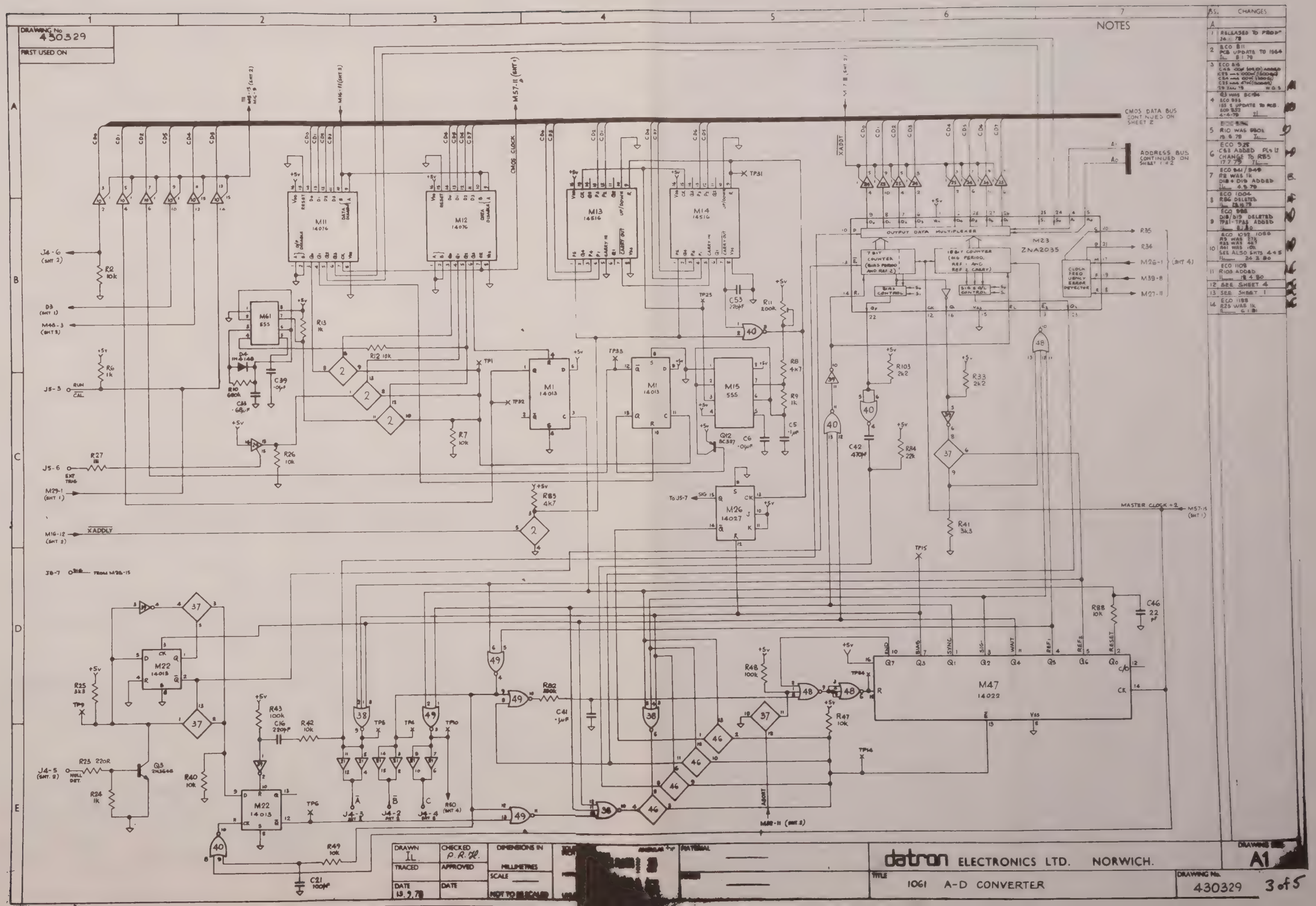
D2 D1 (SHT 1)

DATA BUS CONTINUED ON SHEET 1

DRAWN IL	CHECKED P.R.H.	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 3 PLACES ± DECIMAL TO 1 PLACE ± WHOLE DIMENSIONS ± UNLESS OTHERWISE STATED	MATERIAL ——	datron ELECTRONICS LTD. NORWICH.
TRACED	APPROVED	SCALE ——		FINISH ——	TITLE 1061 CMOS ADDRESS DECODE + I/O CIRCUIT
DATE 13 9 78	DATE	NOT TO BE SCALED			DRAWING No. 430329

DRAWING SIZE A1

2 of 5


DRAWING No 430329
FIRST USED ON
NOTES
CHANGES
CMOS DATA BUS CONTINUED ON SHEET 2
ADDRESS BUS CONTINUED ON SHEET 1 & 2
CMOS CLOCK
XADDT
XADDLY
OUTPUT DATA MULTIPLEXER
M23 ZNA2035
7 BIT COUNTER (BIAS PERIOD AND REF 2)
18BIT COUNTER (20 PERIOD, REF 1 AND REF 2 CARRY)
CLOCK FREQ VERIFY ERROR DETECTOR
BIAS CONTROL
SIG & O/L CONTROL
MASTER CLOCK ÷2
M47 14022
M11 14076
M12 14076
M13 14516
M14 14516
M61 555
M15 555
M1 14013
M22 14013
M26 14027
Q12 BC327
Q3 2N3646
RUN CAL
EXT TRIG
M29-1 (SHT 1)
M16-12 (SHT 2)
J8-7
FROM M28-15
TO J5-7
J4-5 (SHT 2)
J4-6 (SHT 2)
D3 (SHT 1)
M46-3 (SHT 2)
J5-3
J5-6
M57-15 (SHT 1)
M57-11 (SHT 8)
R35
R36
M26-1 (SHT 4)
M39-8
M27-11
M46-15 (SHT 2)
M46-11 (SHT 2)
M46-9 (SHT 2)
M57-11 (SHT 1)
M57-9 (SHT 1)
M57-7 (SHT 2)
M57-5 (SHT 2)
M57-3 (SHT 2)
M57-1 (SHT 2)
M16-11 (SHT 2)
M16-9 (SHT 2)
M16-7 (SHT 2)
M16-5 (SHT 2)
M16-3 (SHT 2)
M16-1 (SHT 2)
J4-3 (SHT 2)
J4-2 (SHT 2)
J4-4 (SHT 2)
R60 (SHT 4)
ABORT
BAND
BIAS
SYNC
SIG
WAIT
REF1
REF2
RESET
DRAWN IL
CHECKED P.R.H.
TRACED
APPROVED
DATE 19.9.78
DIMENSIONS IN MILLIMETRES
SCALE
NOT TO BE SCALED
MATERIAL
datron ELECTRONICS LTD. NORWICH.
TITLE 1061 A-D CONVERTER
DRAWING No. 430329
DRAWING SIZE A1
3 of 5

DRAWING No. 430329

FIRST USED ON 1061

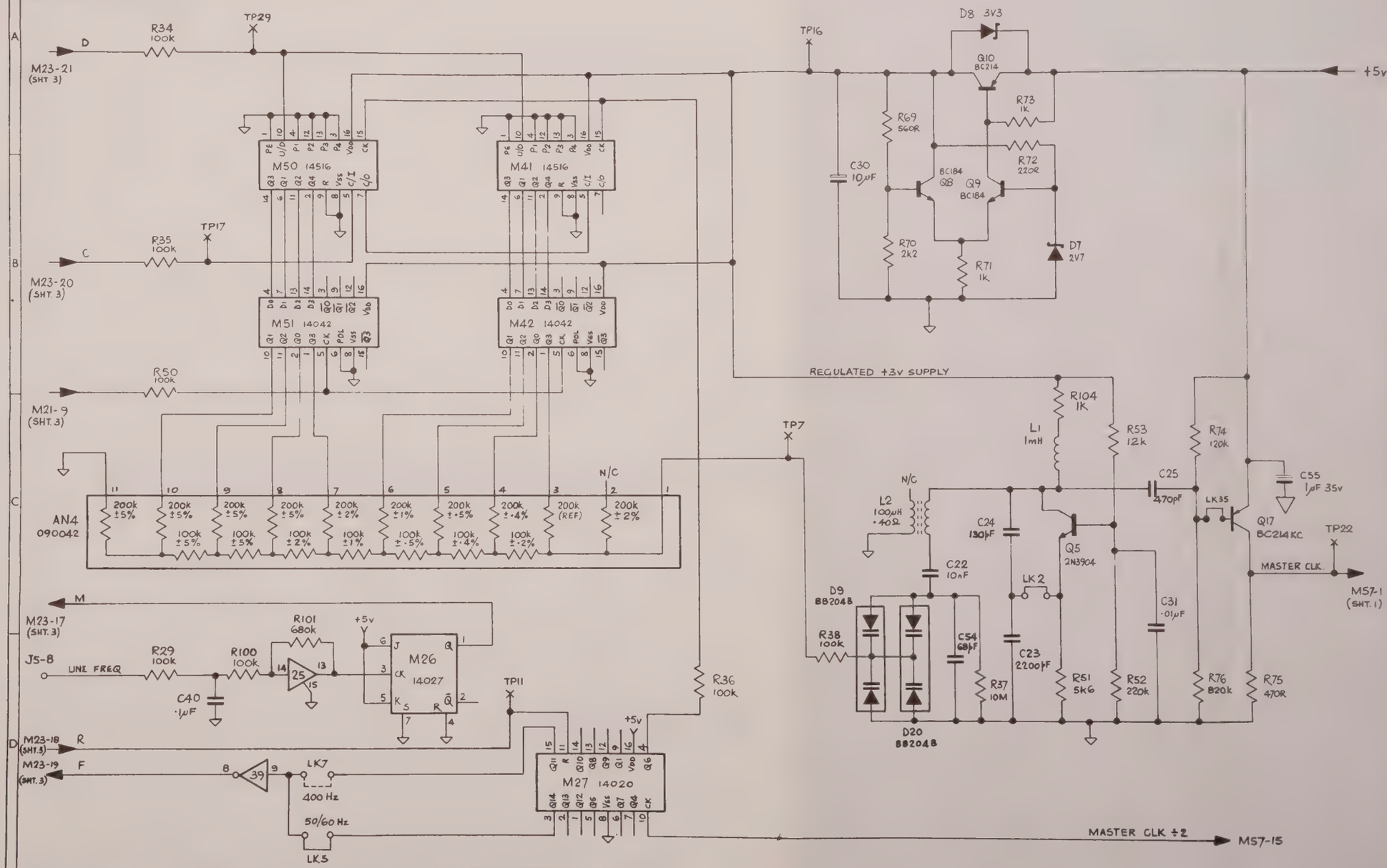
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
A	
1	RELEASED TO PROD 24.11.78
2	ECO 811 PCB UPDATE TO ISSUE 4 IL 8.1.79
3	ECO 815 C48 100nF (102A01) ADDED C23 WAS 1000pF (102G01) C24 WAS 220pF (220G01) C25 WAS 47pF (470G01) 29-JAN 79 WG6
4	ISS 5 UPDATE TO PRD ECO 835/852 4-4-79 IL
5	SEE SHEETS 1 & 3
6	SEE SHEET 3
7	SEE SHEET 3
8	SEE SHEET 3
9	ECO 998 M25 PINS 14 & 13 WERE M39 PINS 13 & 12 RESP R100, R101 ADDED IL 8.1.80
10	ECO 1046 R98 REPLACED BY LK35 Q11 DELETED D9 WAS MVAM-2 D20, C54, C55 & Q17 ADDED C22 WAS 470PF R76 WAS 82k R52 WAS 12k R51 WAS 100R IL 24 3 80
11	SEE SHEETS 1 3 AND 5 IL 18.4.80
12	ECO 1135 R51 WAS 12k Q17 WAS 2N3906 R104 ADDED IL 19.6.80
13	SEE SHEET 1
14	SEE SHEET 3



DRAWN IL	CHECKED P.A.H.	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL ——	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A2
TRACED	APPROVED	SCALE —— NOT TO BE SCALED		FINISH ——	TITLE 1061 LINE LOCKING CIRCUIT	DRAWING No. 430329 SHEET 4 OF 5
DATE 18.9.78	DATE					

DRAWING No. 430329

FIRST USED ON

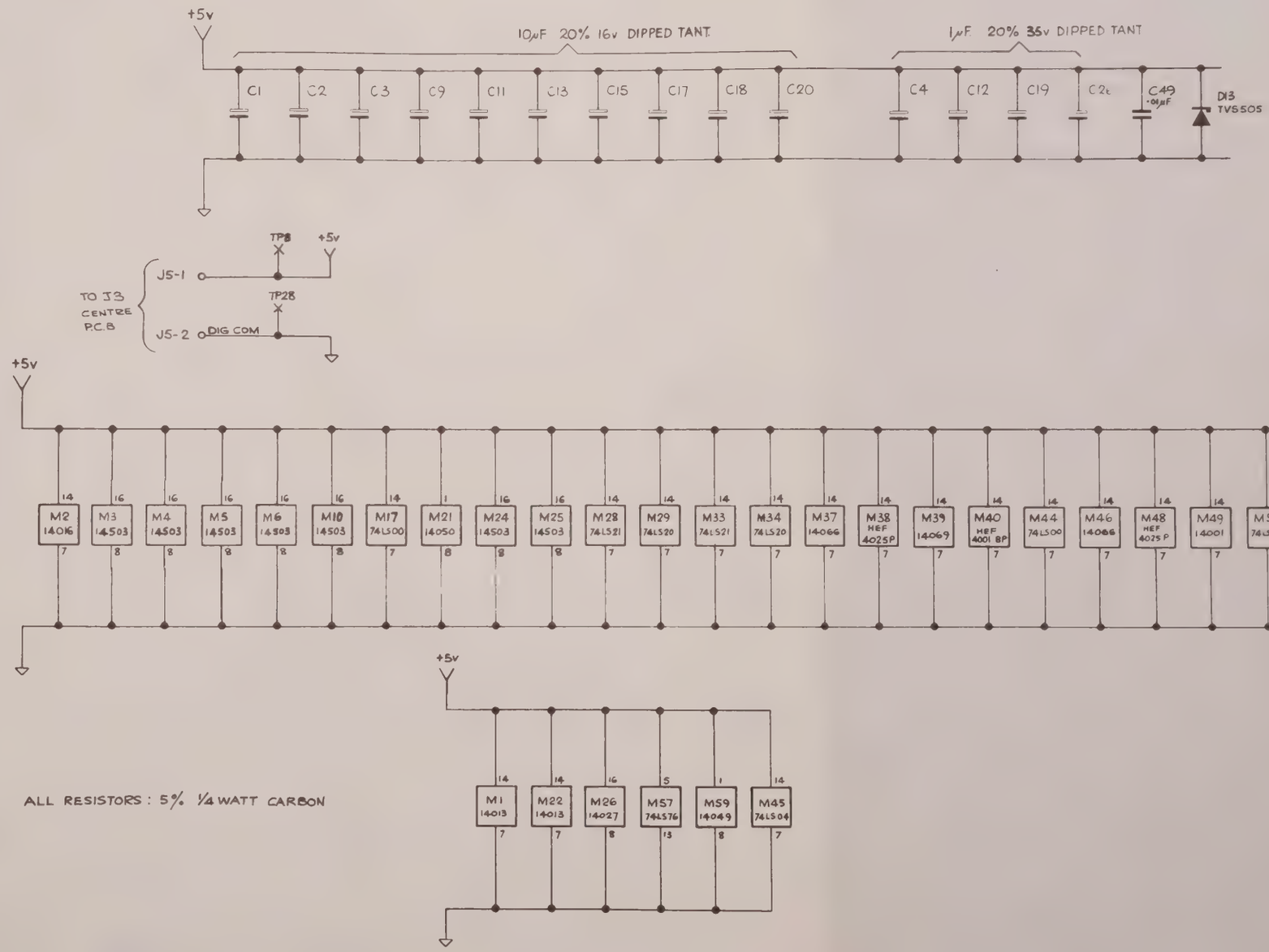
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1	RELEASED TO PROD 25.8.78
2	ECO 811 PCB UPDATE TO ISSUE 4 IL 8.1.79
3	ECO 815 C48 100nF (0805) C23 was 100nF (0805) C24 was 100nF (0805) C25 was 47nF (1206) R9 was 7R W.B.S
4	1555 UPDATE TO REF ECO 836/852 4-4-79 IL
5	SEE SHEETS 1&3
6	SEE SHEET 3
7	SEE SHEET 3
8	SEE SHEET 3
9	ECO 938 1047 SEE SHTS 1-4 M38 WAS 14025 IL 8.1.80
10	ECO 1046 D13 WAS ICTE-5 M37A M46 WERE 14016 IL 24.3.80
11	ECO 1108 M40 WAS 14001 IL 18.4.80
12	SEE SHEET 4
13	SEE SHEET 1
14	SEE SHEET 3



ALL RESISTORS : 5% ¼ WATT CARBON

DRAWN IL	CHECKED P.R.H.	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 2 PLACES ± .01 DECIMAL TO 3 PLACES ± .005 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 0.25mm DECIMAL TO 1 PLACE ± 0.5mm WHOLE DIMENSIONS ± 1mm UNLESS OTHERWISE STATED	MATERIAL
TRACED	APPROVED	SCALE —— NOT TO BE SCALED		FINISH ——
DATE 12.10.78	DATE			

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A2

TITLE 1061 DIGITAL PCB. ASSY.

DRAWING No. 430329

SHEET 5 OF 5

DRAWING No. 400330

FIRST USED ON

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1. MAKE TP1-TP6 FROM 22 SWG. BTC. WIRE — PART N° 540002.

C	[illegible]
1	[illegible]
2	C16 ADDED ECO 1070 17 NOV 78. W.B.S.
3	[illegible] ECO 882 20-FEB 79 W.B.S.
4	R40 WAS 100R, CHANGED TO 68R WAS 100R ECO 884 10 MAY 79 W.B.S.
5	CLIP FOR J1 WAS 606005. ECO.904 2.6.79 IL
6	ECO 1000 & 1025 RIBBON CABLE CLIP WAS 606007, & D12 WAS BZX [illegible]

* NYLATCH - GROMMET
617011 - 4 OFF

* NYLATCH - PLUNGER
617010 - 4 OFF
N.B. FIT FROM COMPONENT SIDE OF PCB.

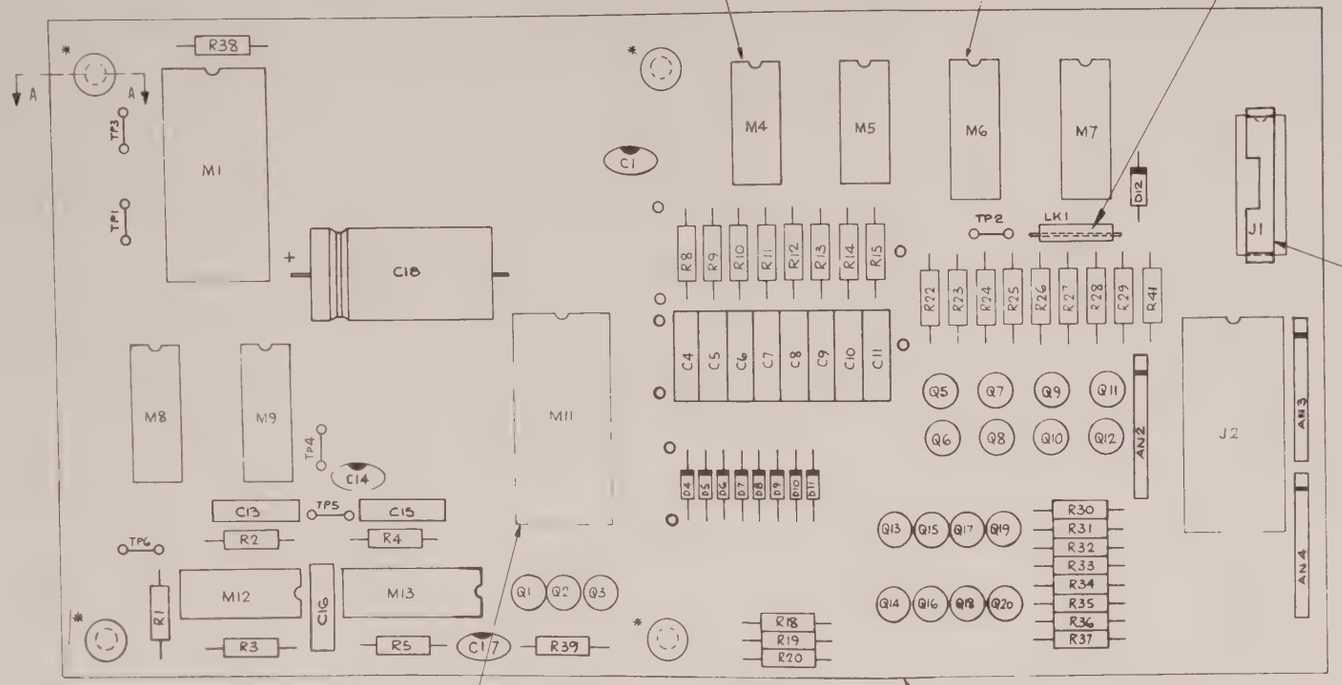
SECTION A-A

MOUNT M4, M5, M12 ON 14 WAY DIL SOCKET 605037 - 3 OFF

MOUNT ALL OTHER ICs ON 16 WAY DIL SOCKET 605038 - 5 OFF

WIRE LINK 540002 SLEEVE 540004

CLIP 606005



MOUNT M11 & M11 ON 24 WAY SOCKETS 605064 - 2 OFF

PCB 410097-5A

DRAWN IL	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCE: DECIMAL TO 1 PLACE ± .1 DECIMAL TO 2 PLACES ± .05 FRACTIONAL ± 1/64 METRIC DIMENSIONS: DECIMAL TO 2 PLACES ± .1mm DECIMAL TO 1 PLACE ± .2mm WHOLE DIMENSIONS ± .4mm UNLESS OTHERWISE STATED	MATERIAL SEE PARTS LIST	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A2
TRACED	APPROVED	SCALE 2:1 NOT TO BE SCALED		FINISH	TITLE 1061 DISPLAY DRIVER PCB. ASSY.	DRAWING No. 400330 SHEET 1 of 7
DATE 3.5.78	DATE					

DRAWING No. 430330

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1	RELEASED FOR PRODUCTION 30-10-78
2	C18 ADDED & R48 ECO 1069 17 NOV 78 W.G.S.
3	AN1 - AN5 ADDED R49 & DP12 ADDED ECO 1092 20 FEB 79 W.G.S.
4	R40 WAS 150R, 600mW NOW WIRE LINK ECO 1154 9 MAY 79 W.G.S.
5	ECO 1075 D17 WAS D8 B.J. 5-1-80

TO J2 DIGITAL P.C.B

TO J2 R.H.S. P.C.B

DISPLAY SEGMENT DESIGNATIONS

UNSPECIFIED DEVICES:
M13 = MC14572
M4, M5 = MC14001BCP
M6, M7 = MC14503BCP
M12 = SN74LS00

R1 – R37 = 5% ¼W CARBON
C1, C15 = 20% 25v DIP TANT
C2–C14, C16 = 10% 250v POLYESTER

DRAWN	CHECKED	DIMENSIONS IN	TOLERANCE UNLESS OTHERWISE STATED	MATERIAL
I.L.		MILLIMETRES		
TRACED	APPROVED	SCALE — NOT TO BE SCALED		FINISH
DATE 30.10.78	DATE			

datron ELECTRONICS LTD. NORWICH.

TITLE: 1061 DISPLAY DRIVER PCB

DRAWING No. 430330

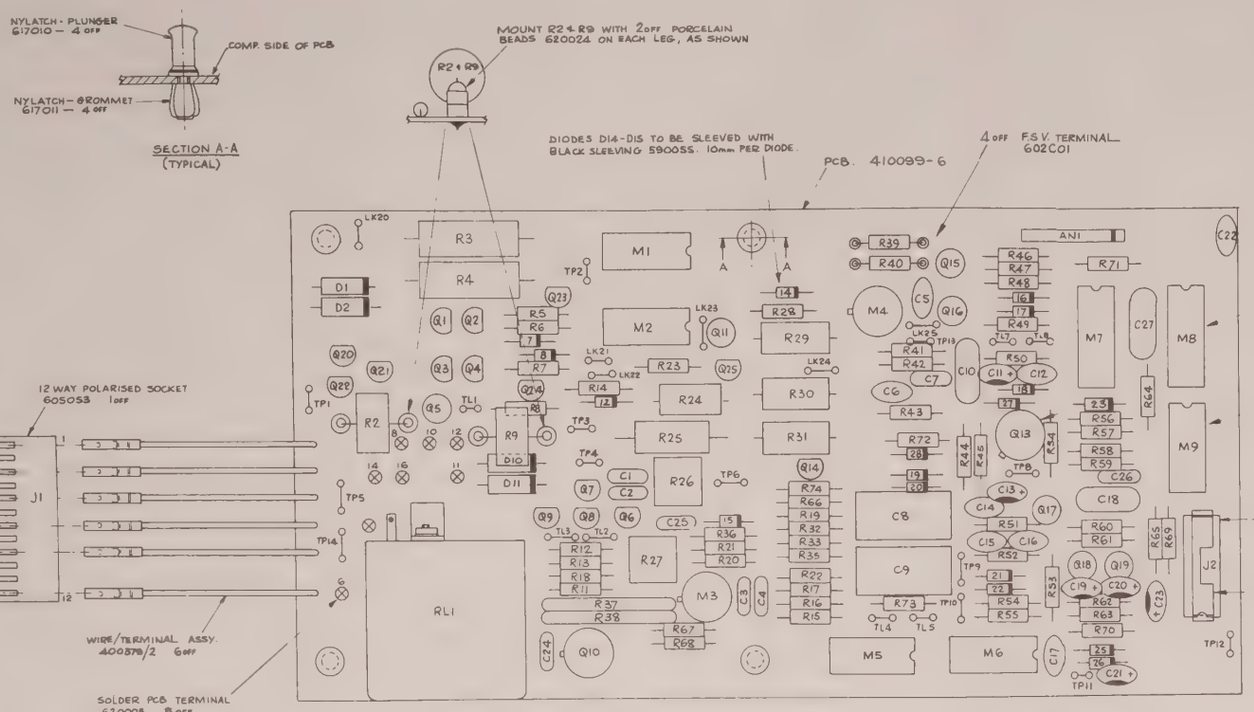
DRAWING SIZE A1

DRAWING No
400331
FIRST USED ON
1061

THIRD ANGLE PROJECTION

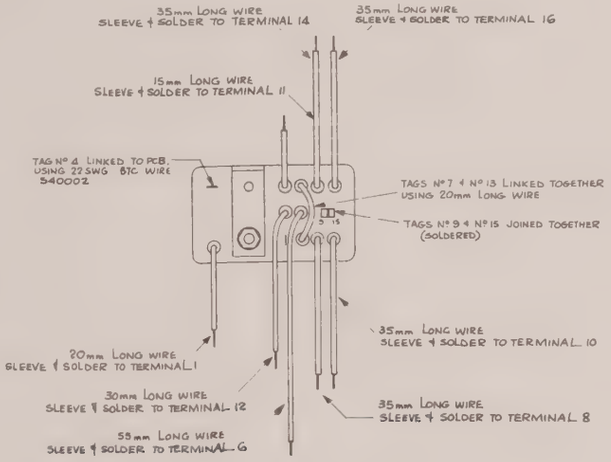
DRAWN IN ACCORDANCE WITH BS 308

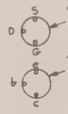
CHANGE:
12 ECO 1176
ASSY COMPLETELY RE-DRAWN. PCB WAS ISSUE 4.
R71 – R74 ADDED
REG/R70 TRACKED-IN.
R10 DELETED.
C27 D28 ADDED
C26 D27 TRACKED-IN
OTHER PARTS LIST CHANGES - SEE ECO.
IL 28.11.80


NYLATCH - PLUNGER 617010 – 4 OFF
COMP. SIDE OF PCB
NYLATCH – GROMMET 617011 – 4 OFF
SECTION A-A (TYPICAL)
MOUNT R2 ↓ R9 WITH 2 OFF PORCELAIN BEADS 620024 ON EACH LEG, AS SHOWN
DIODES D14-D15 TO BE SLEEVED WITH BLACK SLEEVING 590055. 10mm PER DIODE.
PCB. 410099-6
4 OFF F.S.V. TERMINAL 602C01
12 WAY POLARISED SOCKET 605053 1 OFF
J1
WIRE/TERMINAL ASSY. 400378/2 6 OFF
SOLDER PCB TERMINAL 620005 8 OFF
RL1
M1
M2
M3
M4
M5
M6
M7
M8
M9
J2
MOUNT M7 ↓ M8 ON 16 WAY DIL SOCKETS. 605061 2 OFF
MOUNT Q13 ON PAD 618002
MOUNT M1, M2, M5, M6 ↓ M3 ON 14 WAY DIL SOCKETS. 605060 5 OFF
16 WAY DIL SOCKET 605002 1 OFF
RED CLIP 1 OFF 606005

ALL TEST POINTS TO BE MADE FROM 22 SWG BTC WIRE 540002.

NB SOME LINKS SHOWN AS TEST POINT LOOPS SHOULD ALSO BE FORMED THUS, FOR EASE OF PRODUCTION (eg LK20)


35mm LONG WIRE SLEEVE ↓ SOLDER TO TERMINAL 14
35mm LONG WIRE SLEEVE ↓ SOLDER TO TERMINAL 16
15mm LONG WIRE SLEEVE ↓ SOLDER TO TERMINAL 11
TAG Nº 4 LINKED TO PCB. USING 22 SWG BTC WIRE 540002
TAGS Nº 7 ↓ Nº 13 LINKED TOGETHER USING 20mm LONG WIRE
TAGS Nº 9 ↓ Nº 15 JOINED TOGETHER (SOLDERED)
35mm LONG WIRE SLEEVE ↓ SOLDER TO TERMINAL 10
20mm LONG WIRE SLEEVE ↓ SOLDER TO TERMINAL 1
30mm LONG WIRE SLEEVE ↓ SOLDER TO TERMINAL 12
35mm LONG WIRE SLEEVE ↓ SOLDER TO TERMINAL 8
55mm LONG WIRE SLEEVE ↓ SOLDER TO TERMINAL 6



NOTE

ALL WIRE IS 540008 PTFE INSULATED WHITE
ALL LENGTHS OF WIRE SHOWN ON RELAY ARE TOTAL LENGTHS, THEN 4mm IS TO BE STRIPPED FROM EACH END
SLEEVE WIRES WITH 590001 1/2 PIECE FOR EACH CONNECTION. ie. 1 PIECE FOR EACH WIRE

IL

30.7.80

2:1

ANGULAR ±
MATERIAL
FINISH

datron ELECTRONICS LTD. NORWICH.

1061 OHMS PCB. ASSY.

DRAWING SIZE A1

DRAWING No 400331

SHEET 1 OF 12

DRAWING No	430331
FIRST USED ON	1061

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS.	CHANGES
1	RELEASED
2	D13 WAS IN4148 BJ R56 W 4.99 7D C19 - 0.1µF
3	ECO 1035 D24 &. DELETED 20-6-79 IFGO 308 D13 &V8 NOW 12V7 R6 OR NOW 3K83 R15 5K NOW 24K
4	ECO 950 EX WAS DEL ECO 953 D7 D22 & R16 IU 304 & NOW U309. BJ 3-7-79
5	ECO 1054 & 1062 Q12 DELETED R36 WAS 3K3 OMITTED R38 WAS 5M6 OMITTED R40 WAS 33K OMITTED R63 ADDED PCB NOW 4804 TL6 & TP7 DELETED R32 F5.6 DELETED R35 WAS 1M5 OMITTED R64 & C26 ADDED WGS 6 FEB 80
6	SEE SHEET 2
7	ECO 1124 D7 WAS BZY88C3V3 3.6.80
8	ECO 1134 D27 ADDED 15.6.80
9	ECO 1176 R72 R73 R74 & D28 ADDED R 2 DELETED R26 WAS 20K R35 WAS 1M2 SEE ALSO SHEET 2 2.2.80

To J2 LEFT HAND SIDE PCB

RELAY FRAME

SUPPLY CONNECTIONS FOR M1 & M2

DRAWN BJ	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED ANGULAR ± °	MATERIAL
TRACED	APPROVED	SCALE NOT TO BE SCALED		FINISH
DATE 20-4-79	DATE			

datron ELECTRONICS LTD. NORWICH.

TITLE OHMS PCB CIRCUIT 1061

DRAWING No. 430331

DRAWING SIZE A1

SHEET 1 OF 2

DRAWING No. 430331
FIRST USED ON 1061

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

No.	CHANGES
1	RELEASED
2	D23 was IN4148 BJ R66 was 1M (Ω) 1% C19 - 0·1µF 11-8-78
3	ECO 1088 D24 BJ DELETED 20-9-78 ECO 308 D7 D8 V8 now C2V7 R8 10K now 3K3 R15, 16 now 24K
4	ECO 930 Resistor R55 R60 R63 R67 R68 Inverters now 4069 BJ 13 11 79
5	ECO 1064 & 1088 Mod Sht 1 Dec Returns W & S to Pad 60
6	ECO 1109 C26 ADDED IL RL 4 82
7	ECO 1118 C23 was 1nF R66 ADDED IL 3 6 86
8	ECO 1184 R70 ADDED IL 19 6 86
9	ECO 1176 R71 & C27 ADDED IL 12 12 86

TO CB SHT 1

TO CB SHT 1

TL4

TL5

M5 MC14066 BCP

C3 2·2µF G3V

C18 0·47µF G3V

R70 220R

RG5 2K7

To D18 (SHT1)

J2:12

J2:13

TO J5 ANALOGUE PCB

TP10

TP9

C6 10pF

C5 10µF

R54 100K

R52 100K

D22 IN4148

D21 IN4148

C17 1nF

R55 1M

M6 CD4047 BE

R51 1M

RG1 330K

Q17 BC184

Q18 BC184

Q19 BC214

D25 IN4148

RG2 2K7

D26 IN4148

RG3 22K

RL1

C20 1µF 35V

R55 27K

RG0 12K

C19 680pF 35V

R58 27K

TP8

TP12

TP11

C23 10pF 25V

C21 10µF 25V

J2-15

J2-14

J2-16

TO J5 ANALOGUE PCB

AD0 J2-1

AD1 J2-2

AD2 J2-3

AD3 J2-4

AD4 J2-5

AD5 J2-6

AD6 J2-7

AD7 J2-8

OP SEL CLK J2-9

AD CLK J2-10

N/C J2-11

M8 MC 4076 BCP

M7 MC14076 BCP

M9 MC14015 BCP

RG4 33K

R69 10K

RG6 820K

D23 IN4148

C26 100pF

C27 100nF

C22 0·01µF

R71 10K

R57 100K

LD3

LD2

LD1

LD0

LD7

LD5

LD6

LD4

(PIN 2345 OF AN1 100K)
NOTE AN1 PIN 1 IS -15V

(PINS 6,7,8 OF AN1, 100K)

TEST (TO 08 SHT1)

M5 MC 4066

SUPPLY CONNECTIONS TO M5

RANGE TRUTH TABLE

RANGE	LD0	LD1	LD2	LD3	LD4	LD5	LD6	LD7
10Ω	0	0	0	0	0	0	1	X
100Ω	0	0	0	0	0	0	1	X
1KΩ	0	0	0	0	0	1	0	X
10KΩ	1	0	0	0	0	0	0	X
100KΩ	0	0	0	0	1	0	0	X
1MΩ	0	0	1	1	0	0	0	X
10MΩ	0	1	0	1	0	0	0	X
FILTER	X	X	X	X	X	X	X	1
Ω	0	0	0	0	0	0	0	0

LOGIC '0' = -15V
LOGIC '1' = 0V
LOGIC 'X' = 'DONT CARE' CONDITION

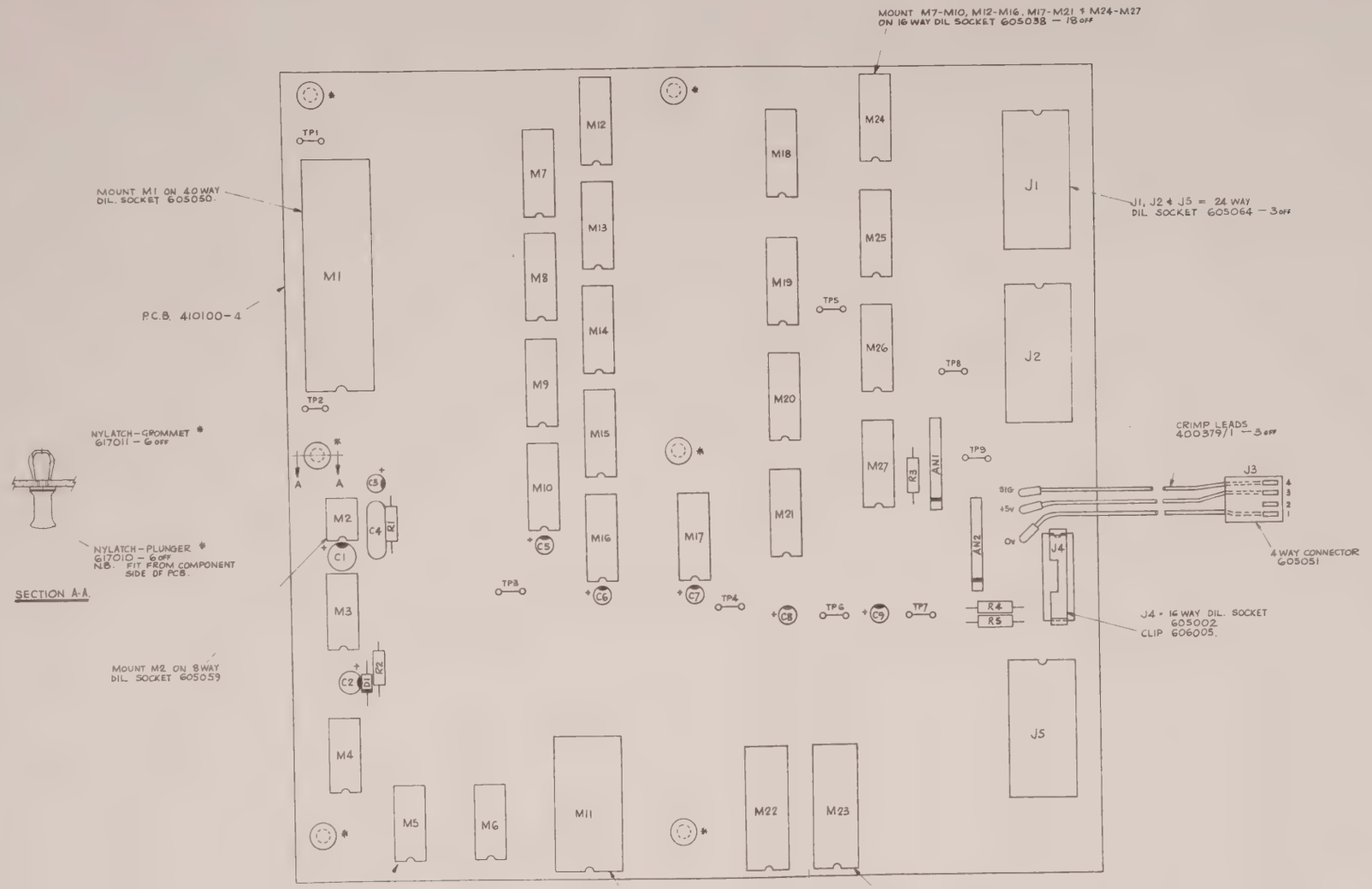
DRAWN BJ	CHECKED	DIMENSIONS IN	TOLERANCES UNLESS STATED	MATERIAL	datron ELECTRONICS LTD. NORWICH.
TRACED	APPROVED	MILLIMETRES		FINISH	DRAWING SIZE A1
DATE 20-4-79	DATE	SCALE NOT TO BE SCALED			TITLE OHMS PCB CIRCUIT 1061
					DRAWING No. 430331
					SHEET 2 OF 3

DRAWING No
400332
FIRST USED ON

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

CHANGES	
1	RELEASED TO PRODN IL 1.2.80
AJ 2	ECO 1078 TEST POINTS TP1-TP9 ADDED J3 PINS RE-ORGANISED PCB WAS ISS 3 IL 22.2.80
AJ 3	ECO 1098 PARTS LIST CHANGE IL 26.3.80
4	ECO 1137 PARTS LIST CHANGE IL 28.7.80



CIRCUIT DIAGRAM = 430332-

IL

31.1.80

2:1

ANGULAR ±
PLACE .005
PLACE .010
PLACE .164
PLACES 1mm
PLACE 2mm
DIMENSIONS 4mm
UNLESS STATED

MATERIAL

FINISH

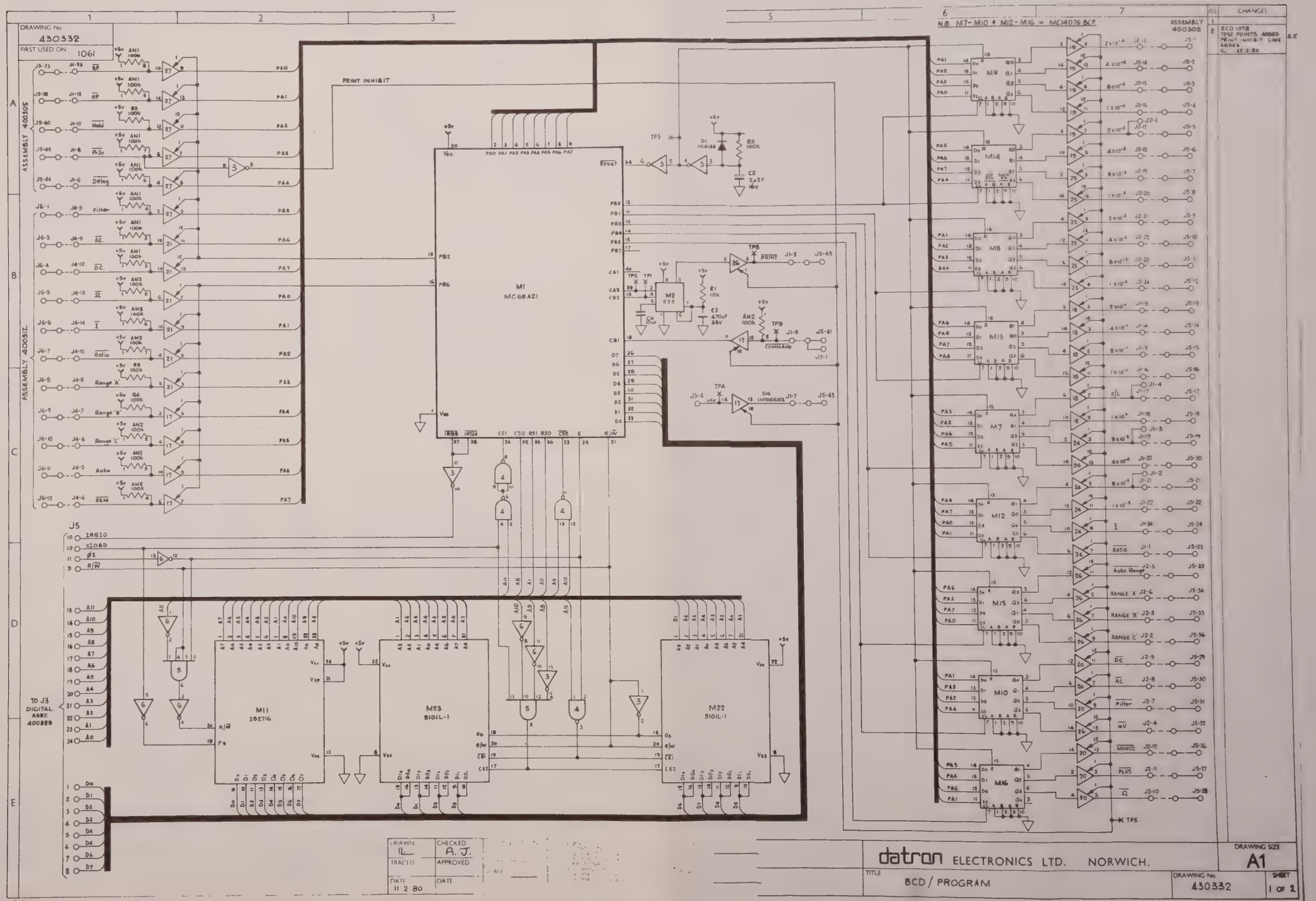
datron ELECTRONICS LTD NORWICH.

BCD/PROGRAM PCB. ASSY.

DRAWING SIZE A1

DRAWING No 400332

SHEET 1 OF 4


DRAWING No 430332
FIRST USED ON 1061
ASSEMBLY 400305
ASSEMBLY 400312
PRINT INHIBIT
M1 MC68A21
M2 555
M11 IB2716
M23 5101L-1
M22 5101L-1
M9
M14
M8
M13
M7
M12
M15
M10
M16
TO J3 DIGITAL ASSY. 400329
NB M7-M10 & M12-M16 = MC14076 BCP
ASSEMBLY 400305
ISS. CHANGES
1 ECO 1078
2 TEST POINTS ADDED PRINT INHIBIT LINE ADDED IL 15 2 80
DRAWN IL
CHECKED A.J.
TRACED
APPROVED
DATE 11 2 80
DATE
datron ELECTRONICS LTD. NORWICH.
DRAWING SIZE A1
TITLE BCD / PROGRAM
DRAWING No 430332
SHEET 1 OF 2

DRAWING No.	
430332	
FIRST USED ON	1061

THIRD ANGLE PROJECTION

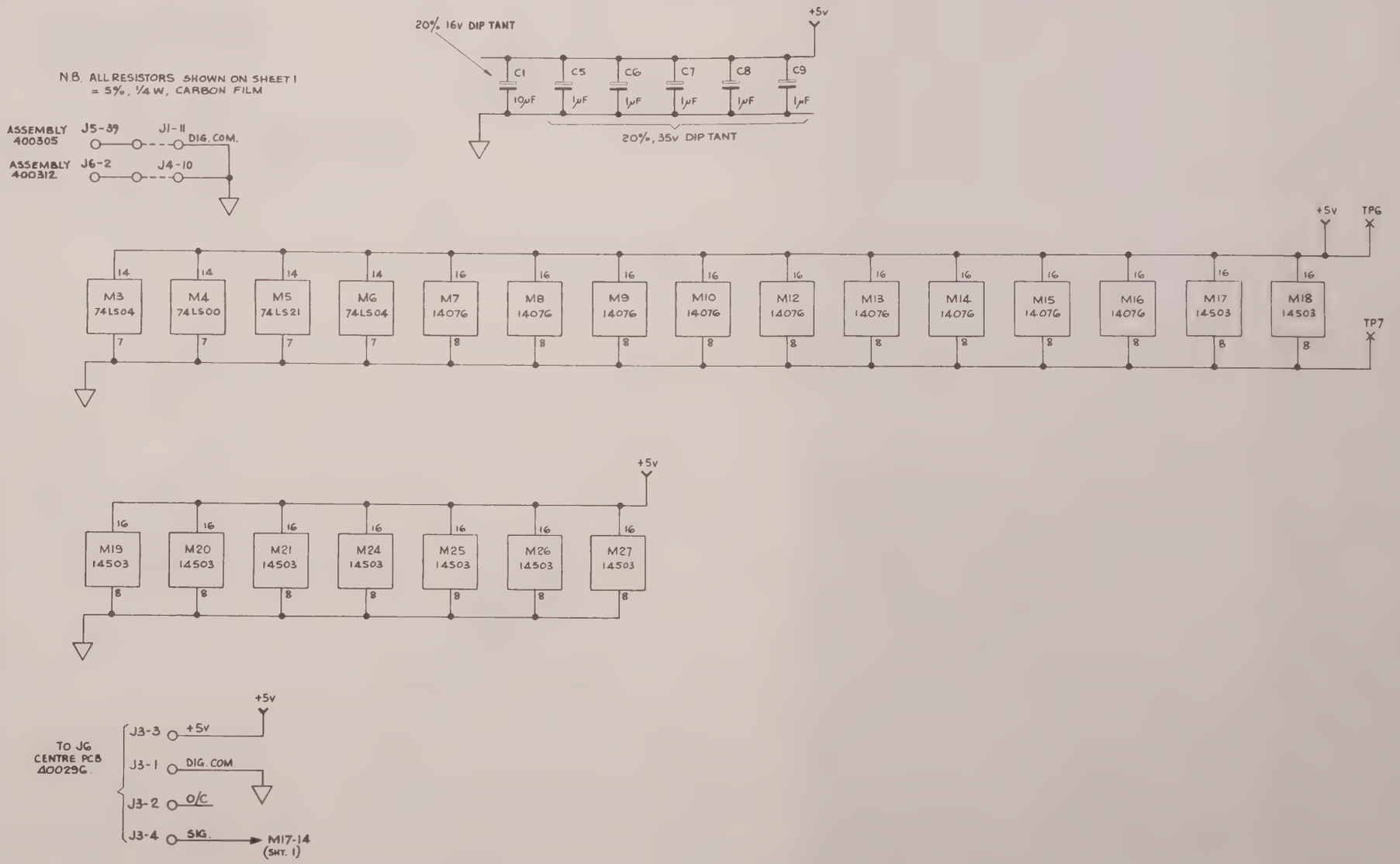
DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

AJ

ISS.	CHANGES
1	
2	TPG & TP7 ADDED IL 22.2.80



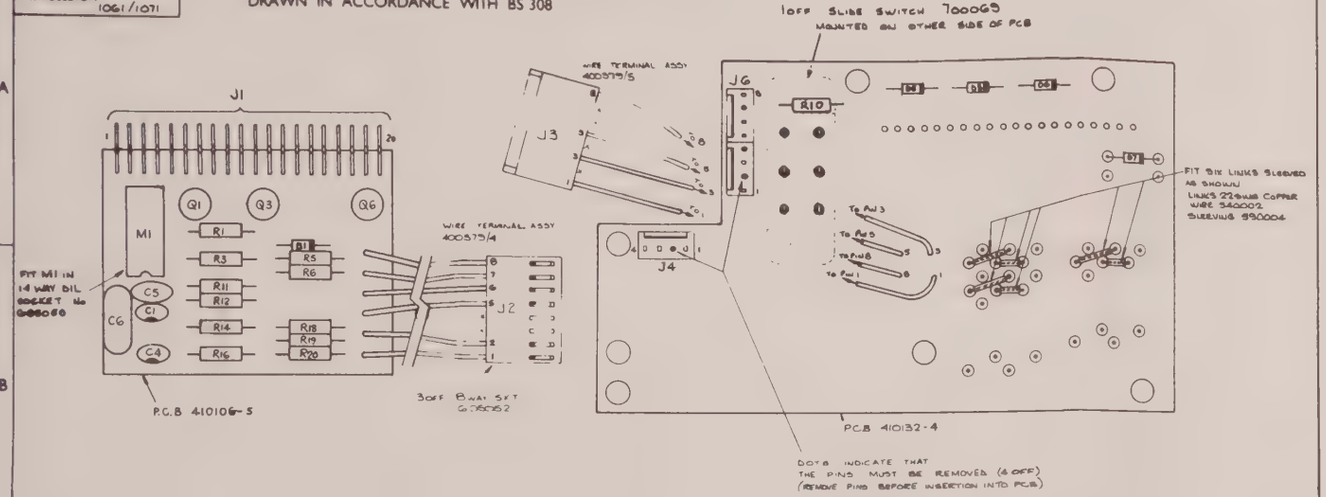
DRAWN	DATE	DIMENSIONS IN	METRIC DIMENSIONS	MATERIAL	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE
IL	11.2.80	MILLIMETRES	ANGULAR ± ½°			A2
CHKD. A.J.	DATE 25.2.80	SCALE ——	DECIMAL TO 2 PLACES ± ·1mm	FINISH	TITLE BCD/PROGRAM	DRAWING No. 430332
APPD.	DATE	NOT TO BE SCALED	DECIMAL TO 1 PLACE ± ·2mm			SHEET 2 OF 2
			WHOLE DIMENSIONS ± 4mm			
			UNLESS OTHERWISE STATED			

DRAWING No. 4003BG

FIRST USED ON 1061/1071

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

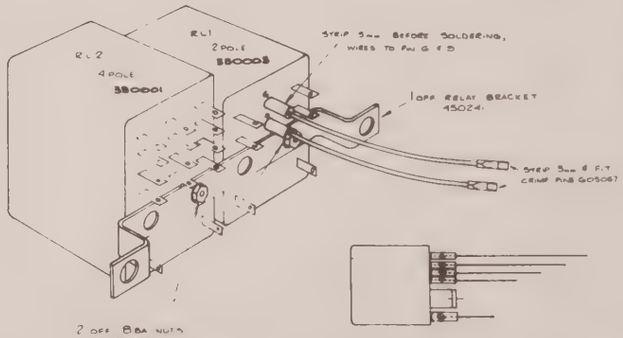


ALL BURRS TO BE REMOVED

NOTES

IMPORTANT

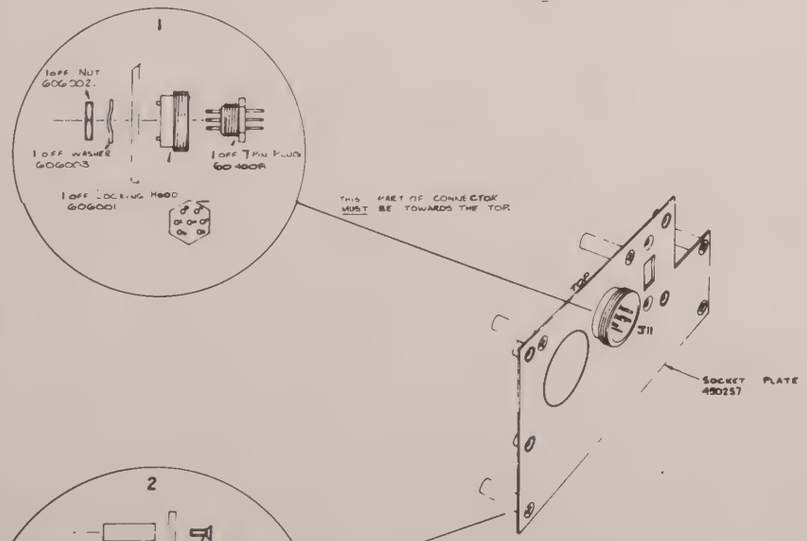
FOR CRIMP PINS USE TOOL No HTR22632A



PROCEDURE

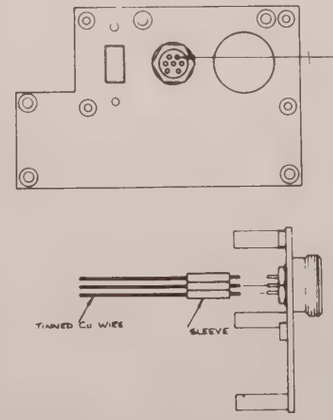
1. FIT BOTH RELAYS TO THE BRACKET (AS SHOWN) WITH WASHER & NUT
2. ON PINS G&D OF THE TWO POLE RELAY SOLDER 70mm OF WHITE WIRE PART No 540008 SLEEVE WITH ½ PIECE OF 990001 (18 0mm).
3. ALL OTHER CONTACTS ARE TO HAVE APPROXIMATELY 60mm OF 22 SWG TINNED COPPER WIRE PART Nº 540002 & SLEEVE EACH WITH ½ PIECE OF 990001
4. STAGGER LENGTHS OF TINNED COPPER WIRE, to ASSIST FITTING TO PCB AS SHOWN

ISS.	CHANGES
A	DRAWN & ENGINEERING ISSUE
1	ECO 972 & 995. R1 & R2 WERE 1T7. INSERT WIRE END ITEM HOUSE PLUG 65000! DELETED EJ 29-10-79
3	ECO 1031 6-11-79 R2 & R3 ADDED. MAIN & SUBSIDIARY ASSEMBLY LEAD 4003794 ADDED. WIRING DIA PLATE UPDATED EJ
4	ECO 1094 R4 R17 MOVED & WAS 33K. 2-1-80
5	ECO 1088 POLARISING KEY FOR J3 REMOVED. J3 REMOVED - SEE SHEET 2. 22.4.80
6	ECO 1147 1154 R10, R14, R16, R18, R19, R20 C4 C5 C6 D5 D6 D7 & Q6 ADDED 23.9.80
7	ECO 1199 R10 WAS 12K. JR 26.2.81


1
1 OFF NUT G06202.
1 OFF WASHER G06003
1 OFF 7 PIN PLUG 60 400A
1 OFF LOCKING HOOD G06001
THIS PART OF CONNECTOR MUST BE TOWARDS THE TOP.
TOP
J11
SOCKET PLATE 490257
2
5 OFF PLASTIC STANDOFF G12020.
5 OFF SCREW M3 x 6mm CSK G11007
POSITIONS OF STANDOFFS

PROCEDURE

1. ASSEMBLE THE 7 PIN PYE PLUG FIRST & ENSURE THAT THE CONNECTOR IS SECURED IN THE POSITION SHOWN.
2. ASSEMBLE THE 5 STANDOFFS IN THE POSITION SHOWN BY THE LARGE DOTS



PROCEDURE

1. ALL PINS ON THE SOCKET EXCEPT PIN B (SHOWN SOLID), SOLDER ON 60mm OF TINNED COPPER WIRE PART Nº 540002 & SLEEVE ALL JOINTS WITH APPROXIMATELY 10mm OF SLEEVING PART NO 990004. THERE SHOULD NOW BE 6 WIRES.

DRAWN W.G SMITH	CHECKED MJD	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS: DECIMAL TO 2 PLACES ± .005; DECIMAL TO 3 PLACES ± .010; FRACTIONAL ± 1/64; METRIC DIMENSIONS: DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm; UNLESS OTHERWISE STATED; ANGULAR ± °	MATERIAL	datron ELECTRONICS LTD. NORWICH.
TRACED	APPROVED	SCALE NOT TO BE SCALED		FINISH	TITLE REAR INPUT ASSY
DATE 10-MAY-79.	DATE 17 MAY 79.				DRAWING No. 4003BG; DRAWING SIZE A1; SHEET 1 OF 6

DRAWING No 400386

FIRST USED ON · 10G1/71

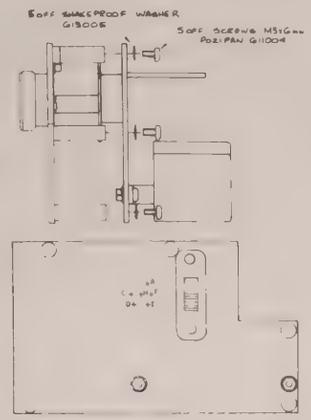
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1	RELEASED TO PRODUCTION 17 MAY 79	WGS
2	SEE SHEET 1	BJ
	28-10-79	MD
3	ADD SHEET 1 & 11	TFB
	7-11-80	MD
4	SEE SHEET 1	7-11-80
	ECO 1085	
5	J5 WAS 2 WAY CONN	MD
	22-4-80	
6	SEE SHEET 1	25-9-80
7	SEE SHEET 2	24-2-81



3/ BOTTOM VIEW SHOWS THE HOLES IN THE PCB (INDICATED BY CROSSES). THESE HOLES ARE FOR THE WIRES FROM THE 7 PIN SOCKET

IT IS A SUGGESTION THAT THE WIRES ARE STAGGERED TO MAKE ASSY EASIER (AS WIRING THE RELAYS)

PROCEDURE

① THE WIRES SHOULD LINE UP WITH THE APPROPRIATE HOLES. IE WIRE FROM PIN A OF SOCKET SHOULD BE INSERTED INTO HOLE A, WIRE FROM PIN C TO HOLE C AND SO ON.

② WHEN THE WIRES ARE INSERTED IN THE APPROPRIATE HOLES SECURE THE 2 ASSYS TOGETHER WITH THE M3X6mm POZI PAN SCREWS & SHAKEPROOF WASHERS, SCREWED IN THE 5 STANDOFFS (AS DETAILED)

③ LIGHTLY PULL ON THE TIN COPPER WIRES SO THE WIRE IS TAUT, THEN SOLDER & CROP IN THE USUAL MANNER.

2/ INSERT CONNECTORS AS SHOWN
SOLDER ALL 20 AMP PINS & CROP LEGS IN USUAL MANNER
THE BOARD IS TO BE AT 90° WHEN SOLDERED IN.

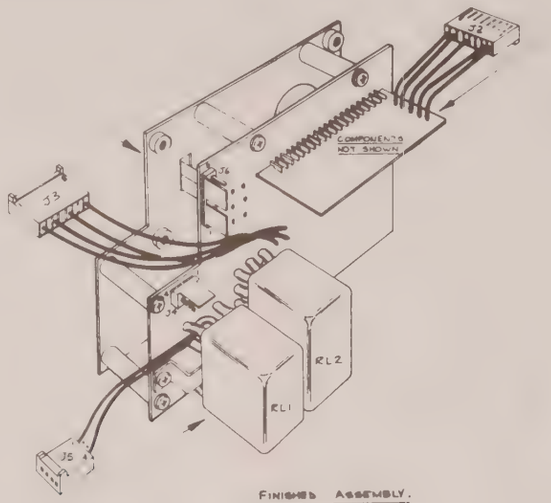
1/ SKETCH BELOW SHOWS THE 2 RELAY & BRACKET ASSEMBLY (FROM SHEET 1). THE CROSSES INDICATE HOLES IN THE PCB INTO WHICH THE WIRES FROM THE RELAYS ARE INSERTED

PROCEDURE

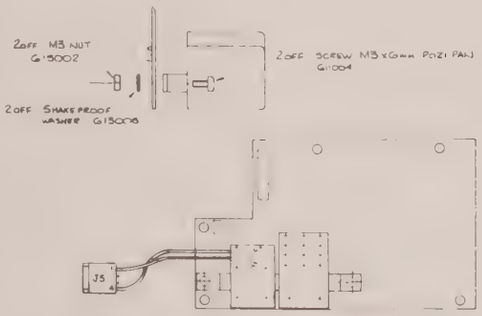
① INSERT THE WIRES INTO THE APPROPRIATE HOLES IN THE PCB (WIRES CUT AT DIFFERENT LENGTHS TO AID ASSEMBLY)

② WHEN THE WIRES ARE ALL IN PLACE SECURE THE BRACKET TO THE PCB USING THE SCREWS, WASHERS & NUTS SHOWN BELOW

③ SOLDER & CROP WIRES IN THE USUAL MANNER INSERT THE CRIMP PINS INTO SOCKET J5 PIN 6 OF RELAY TO PIN 4 OF J5 & PIN 5 TO PIN 1 AS SHOWN BELOW



FINISHED ASSEMBLY.



DRAWN W G SMITH	CHECKED MJD	DIMENSIONS IN	TOLERANCES (NON DIMENSIONS) DECIMAL TO 1 PLACES DECIMAL TO 2 PLACES FRACTIONAL METRIC DIMENSIONS DECIMAL TO 2 PLACES DECIMAL TO 1 PLACE WHOLE DIMENSIONS UNLESS OTHERWISE
TRACED	APPROVED	MILLIMETRES	
DATE 10 MAY 79	DATE 17 MAY 79	SCALE NOT TO BE SCALED	

datron ELECTRONICS LTD. NORWICH.

DRAWING SIZE A1

TITLE REAR INPUT ASSY

DRAWING No 400386

SHEET 2 OF 8

DRAWING No. 430386

FIRST USED ON 1061/1071

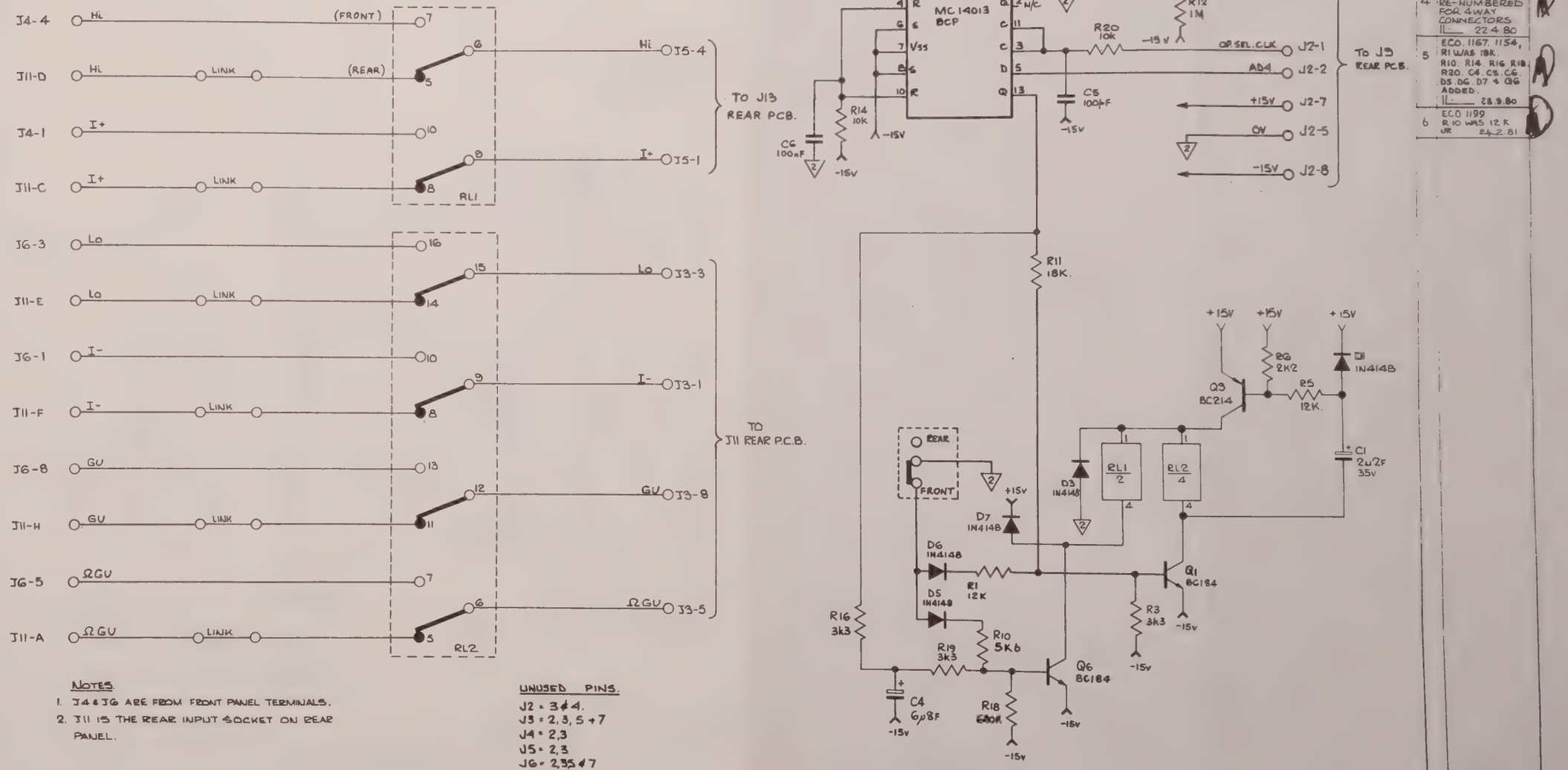
THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

BE REMOVED

NOTES

ISS	CHANGES
A	
1	RELEASED TO PRODUCTION 17 MAY 79 W.G.S.
2	ECO 1051. B.J. M1 ADDED R11 " R12 " D6 DELETED. 6-11-79
3	ECO 1054. B.J. R12 WAS WIRED BETWEEN J2-6 & M1-14. 2-1-80
4	ECO 1085 B.S. - BETWEEN J4-1 & J5-1 REMOVED. PINS OF J4 & J5 RE-NUMBERED FOR 4 WAY CONNECTORS. IL 22.4.80
5	ECO. 1167, 1154, R1 WAS 18K. R10, R14, R16, R18, R20, C4, C5, C6, D5, D6, D7 & Q6 ADDED. IL 28.9.80
6	ECO 1199 R10 WAS 12K JR 24.2.81



NOTES.

1. J4 & J6 ARE FROM FRONT PANEL TERMINALS.
2. J11 IS THE REAR INPUT SOCKET ON REAR PANEL.

UNUSED PINS.

J2 = 3 & 4.
J3 = 2, 3, 5 & 7
J4 = 2, 3
J5 = 2, 3 & 4
J6 = 2, 3, 5 & 7

DRAWN W.G. SMITH	CHECKED	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ½° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL ——	datron ELECTRONICS LTD. NORWICH.	DRAWING SIZE A2
TRACED	APPROVED					
DATE 17 MAY 79	DATE 17 MAY 79	SCALE NOT TO BE SCALED		FINISH ——	TITLE REAR INPUT CIRCUIT DIAGRAM.	DRAWING No. 430386 SHEET 1 OF 1.

DRAWING No. 400402
FIRST USED ON 1061/1071

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1. DO NOT FIT R7 FOR 1061 MODELS.

ISS	CHANGES
1	RELEASED TO PRODN IL 17.9.79
2	ECO 956 + 957 PARTS LIST CHANGES IL 8.10.79 MD
3	ECO 972, 975, 987, 993, 996 RL2 & RL3 WERE ITT RELAY WIRE WAS PVC E11 WAS 120K D18 WAS OA47 R127 100K ADDED BJ 25-10-79 MD
4	ECO 999 1007 PARTS LIST CHANGES R128, C68, C66 & D16 ADDED IL 31.10.79 MD
5	ECO 1010 WIRE TERM ASSYS WERE 400379/2 & 400379/5 D10 SHIELD SKETCH ADDED BJ 5-11-79 MD
6	ECO 1011 1016 1000 1036 C65 & D10 REMOVED D10 REPLACED BY C67 FITTED IN PARALLEL WITH R 28 VALUE CHANGES To PL IL 2.1.80 MD
7	ECO 1059 C68, C69 ADDED SCREWS TO SECURE GUARD SHIELD WERE 5 off 611015 IL 24.1.80 MD
8	ECO 1089 ETCH'T WAS 680K 1000Ω C70 33nF 100150 ADDED W.G.S. 15 FEB 80 MD
9	ECO 1082 PARTS LIST CHANGES IL 27.2.80 MD
10	ECO 1112 1099, 1113 C71 R130 ADDED J2-4 WAS 605057 PTs LT. CHANGE To E50 IL 16.4.80 MD
11	ECO 1133 D17 ADDED IL 13.6.80 MD
12	ECO 1160 C72 & R132 ADDED IL 24.9.80 MD
13	ECO 1190 PARTS LIST CHANGES IL 5.1.81 MD
14	ECO 1201 1207 C34 & C72 DELETED, R136 ADDED OTHER PARTS LIST CHANGES IL 8.4.81 MD
15	ECO 1217 J1 WAS 16 WAY SOCKET JR 19.8.81 MD

ALL TEST LINKS TO BE FORMED AS TEST POINTS

NOTE. WIRES OF J2 SOCKET TO BE AS SHOWN

GUARD SHIELD 450249 TO BE SECURED WITH M3 x 8 m/m POZI-COK SCREWS GI807 BOFS To M3 HEX STANDOFFS

R134 CONNECTED IN SERIES WITH C57 & SOLDERED INTO CLOVERLEAF AS SHOWN

'A'

SLEEVE ALL SOLDERED JOINTS WITH HALF PIECE OF 590001

ALL WIRES TO RELAY PINS 7/-2 PTFE INSULATED - WHITE 540008

25mm

R133 SOLDERED BETWEEN RL3 PINS 7 & 10. LEADS SLEEVED WITH 580001

BRASS STRIP 85mm LONG 630107
N.B STRIP SHOULD BE SOLDERED AS CLOSE AS POSSIBLE TO LEFT HAND SIDE OF COPPER 'LAND' (AS SHOWN). ENSURE THAT SOLDER DOES NOT ENCROUCH ON AREA AROUND HEX STANDOFF POSITION. STRIP SHOULD ALSO BE 3.0 mm FROM EDGE OF BOARD TO CLEAR PCB TRACK

2 off SOLDER TERMINAL 620003

CRIMP TERMINAL (FOR BLANKING ONLY) 605056

FIT C70 ACROSS E26 AS SHOWN

PCB. 410136-4

WIRE/TERMINAL ASSY 400375/1

VIEW ON BASE OF RELAY RL3

2 off FSV TERMINAL 602001

8 WAY POLARISED SOCKET 602052

WIRE 100mm PTFE INSULATED 7/0.2 WHITE 540008, PLUS GOLD CRIMP TERMINAL 605057. FITTED AS SHOWN.

1 OFF 16 WAY RIBBON CABLE ASSY 571095/C BOLDER END WITHOUT CABLE CLIP TO P.C.B

LINK C57 To C61 & TO R123 VIA CLOVERLEAF TERMINALS USING SLEEVED LINKS 540002/590004

N.B. ENSURE THAT IDENT MARK IS AT TOP OF D11 AS SHOWN

ALL TEST POINTS & TEST LINKS USE 27 SWG BTC WIRE 540002

R7 IS REMOVED WHEN BOARD IS USED IN 1061

BRASS STRIP 35mm LONG BUTT END OF STRIP TO ADJOINING 85mm STRIP AND SOLDER AS SHOWN

MOUNT M6 ON 'BREAKAWAY' TERMINAL STRIPS 602004 - 16 off

FIT C49, C51, C58, C59, C60 (GLASS CAPS.) TO PCB MOUNTED ON THIN END

VIEW IN DIRECTION OF ARROW 'B'

SLEEVE LEADS OF C68/C69 BEFORE SOLDERING USE SLEEVE 590004 A/R

15 off CLOVERLEAF 620005
N.B TERMINALS SHOULD BE FITTED WITH SOLDER CUPS ON X-Y AXIS, AS SHOWN

MOUNT M3, M4 & M7 ON 16 WAY D.I.L SOCKET - 3 OFF 605061

3-48 UNC NUT 615005 2 off
M2.5 WASHER 613014 2 off

M3 x 8 P/PAN SCREW 611016 2 off
M3 NUT 615002 2 off
M3 SHAKEPROOF 613005 2 off

RELAY BRACKET 459112 2 off

LINK PINS 11 & 12 ON M4 540002 (BTC WIRE) SOLDER ON UNDERSIDE.

MOUNT M5 ON 14 WAY D.I.L SOCKET 6050

SLEEVE LEADS OF D17 BEFORE SOLDERING SLEEVE 590004

3 off M3 STANDOFF 612021 SECURE FROM UNDERSIDE WITH M3 x 8 P/PAN SCREW 611016 3 off M3 SHAKEPROOF 613005 3 off

NOTE:- FIT E806 AS SHOWN ON DRG FIT TCR50G AS SHOWN WITH FLAT AT TOP

TCR 50G

* NYLATCH GROMMET 617011 - 4 off

* NYLATCH PLUNGER 617010 - 4 off
NB FIT FROM COMPONENT SIDE OF PCB

SECTION A-A

SOLDER WIRE ENDS TO SOLDER TERMINALS & SLEEVE WITH ½ PIECE OF 590001

SOLDER WIRE LINK BETWEEN RELAY COIL TERMINAL & PCB AS SHOWN (IN SAME POSITION ON RL2 & RL3. 540002

To J2

CONNECT C71 & R130 IN SERIES, SOLDER BETWEEN Q18 & C34

CUT THIS TRACK - COMP SIDE OF P.C.B

VIEW IN DIRECTION OF ARROW 'A'
SHOWING ONLY RELAY WIRING

DRAWN IL	CHECKED RLW	DIMENSIONS IN MILLIMETRES	TOLERANCES ANGULAR ± ° INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 3 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	MATERIAL AS PARTS LIST	datron ELECTRONICS LTD. NORWICH.		DRAWING SIZE A1
TRACED	APPROVED	SCALE 2:1		FINISH	TITLE A.C. PCB. ASSY. (OPTION 10) 1061/1071	DRAWING No. 400402	SHEET 1 OF 17
DATE 22.8.79	DATE 3.9.79	NOT TO BE SCALED					

DRAWING No 430402

FIRST USED ON 1061/1071

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

ISS	CHANGES
1	RELEASED TO PRODN IL 17.9.79
2	ECO 996 987 R10 WAS 220K R11 WAS 18K R18 WAS 33K CG WAS 680nF SEE ALSO SHEET 2 IL 8.10.79
3	ECO 998 996 R11 WAS 120K R127 100M ADDED D13 WAS OA47 B.J 24-10-79
4	ECO 999 1007 R117 WAS 100R M4/11 & 12 LINKED C44 WAS 1µF C56 WAS 10nF C34 WAS 10nF C46 WAS 2nF C63 & C66 ADDED R81 WAS 100R R82 WAS 1K R128 ADDED SEE ALSO SHT 2 IL 1 11 79
5	ECO 1011 1016 1036 C43 WAS 3n3F C46 WAS 10nF C34 WAS 22µF TANT C69 REMOVED C66 WAS 220pF R128 WAS 15M R81 R82 WERE 330R C56 WAS 100pF D10 REMOVED C67 R129 ADDED R106 WAS 10K R105 WAS 68K C64 WAS 5p6F IL 2.1.80
6	ECO 1058 C64 C69 ADDED IL 23.1.80
7	ECO 1069 SEE SHEET 2 IL 15.2.80
8	SEE SHEET 2
9	ECO 1112 1113 C71, R130, R133, R134 ADDED SEE ALSO SHEET 2 IL 16.4.80
10	ECO 1133 D17 ADDED IL 13.6.80
11	ECO 1160 R135 & C72 ADDED
12	ECO 1190 D11 WAS MUAM-E C30 WAS 15pF IL 5.1.80
13	ECO 1201 1207 C34 & C72 DELETED R136 ADDED C39 WAS 100pF C44 WAS 10µF C45 WAS 10pF C46 WAS 8p2F R78 WAS 110k Q28 WAS 2N3904 IL 8.4.81

IL	R.J.W APPROVED	DIMENSIONS IN MILLIMETRES	TOLERANCES INCH DIMENSIONS DECIMAL TO 3 PLACES ± .005 DECIMAL TO 2 PLACES ± .010 FRACTIONAL ± 1/64 METRIC DIMENSIONS DECIMAL TO 2 PLACES ± 1mm DECIMAL TO 1 PLACE ± 2mm WHOLE DIMENSIONS ± 4mm UNLESS OTHERWISE STATED	ANGULAR ± °	MATERIAL —
DRAWN	DATE 20.8.79	DATE 3.9.79	NOT TO BE SCALED		FINISH —

datron ELECTRONICS LTD. NORWICH.

TITLE 1061/1071 AC - PREAMP

DRAWING SIZE A1

DRAWING No 430402

SHEET 1 OF 2

DRAWING No. 430402
FIRST USED ON

THIRD ANGLE PROJECTION

DRAWN IN ACCORDANCE WITH BS 308

ALL BURRS TO BE REMOVED

NOTES

1. RESISTOR R7 IS NOT FITTED ON A.C. ASSEMBLIES USED IN 1061's INSTRUMENTS.

ISS.	CHANGES
1	RELEASED TO PRODN IL 17.9.79
2	ECO 956 C2 WAS 680nF IL 8.10.79
3	SEE SHT 1. 24-10-79 B.J.
4	R83 WAS 10K R94 WAS 1M5 D16 ADDED IL 1.11.79
5	ECO. 1011, 1016, 1036 R26 WAS 180K R7 WAS 1M IL 2.1.80
6	SEE SHEET 1
7	ECO. 1069 R70 WAS 680R R71 WAS 680R C70 ADDED IL 16.2.80
8	ECO. 1082 R27 WAS 680K R36 WAS 820K R34 WAS 1M IL 27.2.80
9	ECO. 1112 R60 WAS 100R IL 16.4.80
10	SEE SHEET 1
11	SEE SHEET 1
12	SEE SHEET 1
13	SEE SHEET 1

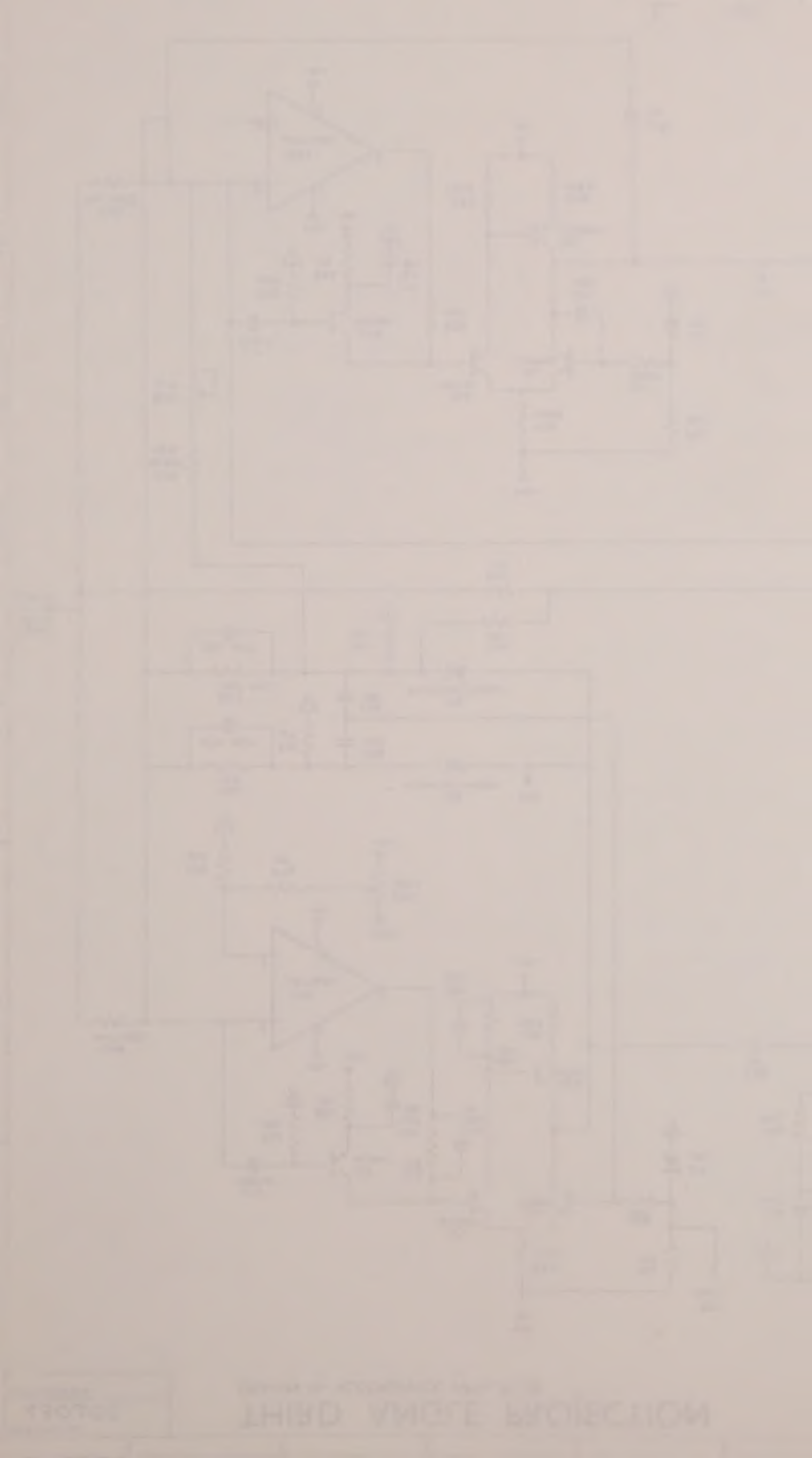
DRAWN IL 20.8.79	CHECKED RJ 10 APPROVED DATE 3.9.79	DIMENSIONS IN MILLIMETRES SCALE NOT TO BE SCALED	TOLERANCES INCH DIMENSIONS: DECIMAL TO 3 PLACES ± .005; DECIMAL TO 2 PLACES ± .010; FRACTIONAL ± 1/64. METRIC DIMENSIONS: DECIMAL TO 2 PLACES ± 1mm; DECIMAL TO 1 PLACE ± 2mm; WHOLE DIMENSIONS ± 4mm. UNLESS OTHERWISE STATED. ANGULAR ± °	MATERIAL —— FINISH ——	datron ELECTRONICS LTD. NORWICH.

TITLE: 1061/1071 A.C. RMS SECTION.

DRAWING SIZE: A1

DRAWING No. 430402

SHEET 2 OF 2



UNITED KINGDOM & EIRE
Datron Electronics Limited
Hurricane Way
Norwich
Tel: 0603-404824
Tlx: 975173

UNITED STATES
Datron Instruments Inc
Laguna Hills Business Park
23011 Moulton Parkway
Laguna Hills
CA 92653
Tel: 714-830-8860
Tlx: 910-595-1771

AUSTRALIA
The Dindima Group Pty Ltd
P O Box 113
Balwyn
Victoria 3103
Tel: 836-6533
Tlx: 34145

AUSTRIA
Kontron GmbH & Co
Electronics Department
Industriestrasse B13
A-2345 Brunn Am Gebirge
Tel: 02236-86631
Tlx: 79337

BELGIUM
MCR Electronic Marketing
100 Chausee de Nivelles
1420 Braine L'Alleud
Tel: 384-8062
Tlx: 62569

DENMARK
CKI
Laurentsvej 28
2880 Kobenhavn-Bagsvaerd
Tel: 984411
Tlx: 37410

EASTERN EUROPE
Data Loop Ltd
Milton Heath
Dorking
Surrey RH4 3NB
England
Tel: 0306-81166
Tlx: 859417

EGYPT & MIDDLE EAST
E P I C
P O Box 2682
Horriya
Heliopolis
Tel: 860819
Tlx: 92307

FINLAND
Finn Metric OY
PB4
Riihitontuntie 2
SF 02201
ESP00 20
Tel: Helsinki 01-358-0423911
Tlx: 122018

FRANCE
Kontron Electronique
BP99
6 Rue des Freres Caudron
78140 Velizy-Villacoublay
Tel: 01033-1-946-9722
Tlx: 695673

GERMANY
Kontron Elektronik GmbH
Breslauer Strasse 2
8057 Eching
Munich
Tel: 01049-89-319011
Tlx: 522122

JAPAN
Cornes & Co
8th Floor Maruzen Building
3-10 Nihonhoshi 2 Chome
Chuo-Ku
Tokyo
Tel: 272-5771
Tlx: 2222987

INDIA
Electronic Enterprises
PB No 6367
Unit 216
Regal Industrial Estate
Acharya Donde Marg
Sewri
Bombay 400 015
Tel: 443096
Tlx: 112971

ISRAEL
Madel Technology Ltd
P O Box 36751
Tel Aviv
Tel: 476490
Tlx: 341118

ITALY
Telav International SRL
Viale Leonardo da Vinci 43
20090 Trezzano sul Naviglio
Milano
Tel: 4158746
Tlx: 332202

NETHERLANDS
Air Parts International BV
P O Box 255
12 Kalkovenweg
2400 AG Alphen a. d. Rijn
Tel: 1720-29300
Tlx: 39564

NORWAY
Norsk Marconi
Ryensvingen 5
P O Box 50
Manglerud
Oslo 6
Tel: 67-04-80
Tlx: 16218

PORTUGAL
LUFA Engenheiros
Campo Martires da Patria
106-4^{e}
400 Porto
Tel: 382665
Tlx: 24249

SINGAPORE
Necom Private Ltd
Room 1023B
Maxwell House
Maxwell Road
Singapore 1
Tel: 2212001
Tlx: 23673

SOUTH AFRICA
Peter Jones Electronic
Equipment Pty Ltd
P O Box 31582
Braamfontein
Tel: 37-7943
Tlx: 86935

SPAIN
C R Mares s.a.
Calle Valencia 333
Barcelona 9
Tel: 257-6200
Tlx: 54676

SWEDEN
Oltronix AB
Box 20085
S 16120
Bromma
Tel: 010-468-28-28-40
Tlx: 10738

SWITZERLAND
Precitek Electronic AG
Weinbergstrasse 148
CH-8006
Zurich
Tel: 010-411-8442950
Tlx: 56645

For Customers in countries not listed above please contact DATRON ELECTRONICS LIMITED in the United Kingdom.

www.manualsplus.com